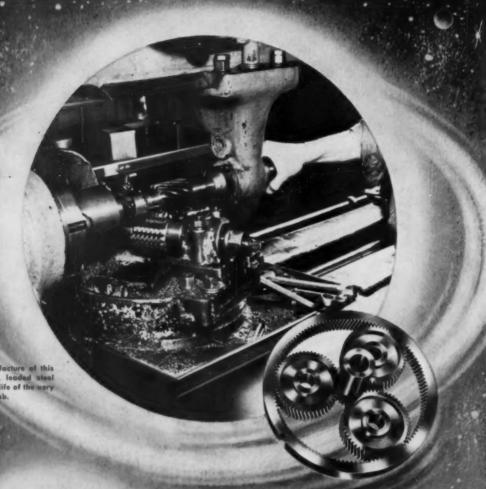
The IRONAGE

The National Metalworking Weekly



Product
Diversification:
Look Before
You Leap P.51

Digest of the Week P-2



Another star in this production is

COPPERWELD LEADED STEEL For many years, The Philadelphia Gear Works has been a leader in the field of making gears of all types, from the very simple to the most complex, precision assemblies.

The faster feeds and speeds with which leaded steels can be worked give them an average decrease in production time of 30%. In some cases production time was decreased by as much as 68%.

In many cases, the life of expensive cutting tools was increased 100%.

Often the finer finish of Copperweld Leaded Steels reduced the final de-burring and polishing operations. Truly, Copperweld Leaded Steel is the steel with "built-in productivity."



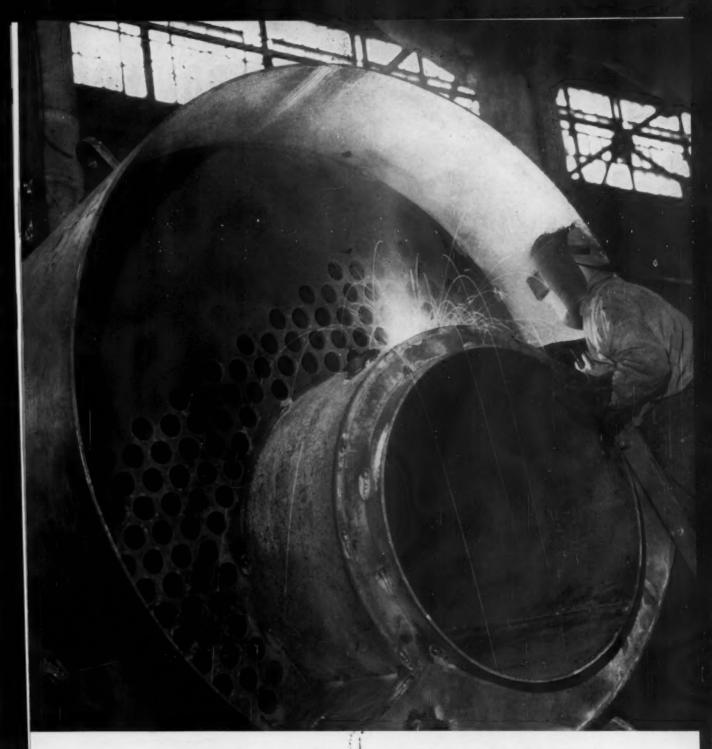
COPPERWELD STEEL COMPANY

Steel Division . Warren, Ohio

EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N.Y.

For further detail on Copperweld Leaded Alleys, write for free beaklet, "Lead Teached Steels."





Welding Steel Plate for Scotch Boiler

This sturdy scotch wet-back boiler, fabricated from steel plate fusion-welded at all seams, will give years of dependable service. It is one of the many types and sizes of heating and power boilers fabricated from Bethlehem plates by Farrar and Trefts Division of Adsco Industries, Inc., Buffalo.

The uniform quality of Bethlehem plates makes them ideally suited to boiler construction. For the use of Bethlehem plates, together with good welding techniques, gives assurance of sound welds. Bethlehem plates

come in a full range of sheared and universal mill sizes.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL



Aug. 16, 1956-Vol. 178, No. 7

IRON AGE

Digest of the Week in Metalworking

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NEWS DEVELOPMENTS

FREIGHT CAR SHORTAGE

WILL HURT P. 56

The steel strike threw car makers' production schedules seriously out of



joint. Railroads this fall face the problem of handling large steel shipments, new car models and an unexpectedly large agricultural crop.

INSURANCE: PROTECTION IN THE RIGHT PLACE

All metalworking companies carry insurance, but some are still forced out of business by disaster. Make sure your protection is where you really need it. Coinsurance and deductibles reduce the strain of premiums.

P. 57

METAL LATH MAKERS

BATTLE COMPETITION It's a tough fight, but metal lath

manufacturers are pulling away from competitors. A century ago, metal had only wood to contend with. Now at least a half dozen other nonferrous materials are used for lath. This is no industry for sleepers.

FLOOD: THE OUNCE OF PREVENTION

P. 59 On the first anniversary of the Nau-

gatuck River Valley flood, one of its hardest hit victims tells what it is doing to try and prevent a recurrence of another such disaster. Final solution seen as construction of dams.



THE URGE to diversify beats deep within the corporate hearts of many companies. Richard W. Dalzell, management consultant, tells how to go about it. But he also warns that it's not easy, that there are pitfalls to avoid. Rewards can be great. P. 51.

FAST-TAX AID HASTENED BY SUEZ CRISIS

Seizure of the Suez Canal by Egypt has gotten U. S. mobilization officials to wondering what shape we would be in if Near East oil were unavailable. It cast a new light on the need for Jones & Laughlin's proposed tube mill in Texas. Five-year tax write offs are in the wind for other producers, as Washington officials look for new ways to encourage production.

P. 73

FEATURE ARTICLES

DESIGN SPECIAL HOODS FOR MACHINING TOXIC METALS P. 91

Many modern metals used in atomic energy and related programs are very costly. Some produce toxic dusts. Machining them poses a dual problem of recovering every chip while keeping shop air pure. Answer is to put a tight exhaust hood over the machining area, while providing good operator visibility, easy access to tools. Here's how it's done on standard lathes, millers.

SHOT PEENERS HANDLE LARGER, MORE COMPLEX PARTS P. 96

Shot peening improves fatigue resistance in many parts subjected to varying tensile stresses. Result has been steady increase in technique's utility. Growth of independent peeners is one measure of peening's place today. Here are some jobs one independent's now doing, and some tips on how it does them.

DYNAMIC CHECKS POINT WAY TO LONGER CHAIN LIFE P. 98

Unlike other power trains, chain drives don't howl or clatter to warn of mismated parts—they simply wear out sooner. Recent performance tests suggest what users can do to lengthen chain life. Effects of chordal action, sprocket eccentricity, non-uniform pitch were charted. Here are results.

MATE PROCESSES FOR BETTER CASTING QUALITY P. 100

Selectively mate two proved foundry processes like permanent mold and centrifugal casting. Then blend in today's special foundry techniques and latest mold design advances. Result: aircraft-quality castings at less cost. At Northrup Aircraft, resultant castings show excellent physical properties, surface finish of 100 RMS or better. Machining's all but eliminated.

HOW BORON, GRAIN SIZE AFFECT IMPACT PROPERTIES P. 102

Along with carbon and alloy content, both boron additions and grain size have an important effect on impact strength of low alloy steels. The ratio that may exist between molybdenum and phosphorus contents is another factor not to be overlooked. Here are more findings in a major study program.

MARKETS AND PRICES

INDUSTRIAL TRUCK MARKET PULLS AHEAD

With sales so far this year 40 pct ahead of 1955's all-time high, the industrial truck and tractor industry is looking ahead to an era of tremendous expansion. Responsible are rising labor costs and faster production machinery. New companies are entering the field.

CURTISS-WRIGHT RESCUES

STUDEBAKER-PACKARD

Deal between Curtiss-Wright and S-P has advantages for both companies. An eventual merger is a possibility, but Curtiss-Wright still has a way out should Studebaker-Packard flounder. More and bigger defense contracts in line for S-P.

WEST COAST ORDNANCE

P. 75

P. 68

There is plenty of work in the Los Angeles Ordnance District, but contractors are worried because it isn't diversified enough. Practically all is missile research and development. Government's dispersal policy is another thorn in the bed of roses.

FOREIGN POLICY PAINLESS

FOR TAXPAYERS P. 77

Associations of American machine tool builders are helping industrially backward nations by supplying know-how with their machine tools. Local engineers spend full time in a country. Main function is to teach, not to sell. Revolving credit for customers.

STEEL STRIKE EFFECTS ARE FAR-REACHING

P. 147

Steel strike losses will have repercussions everywhere. European consumers had counted on shipments from U. S. to bolster own supplies. But strike losses mean that export orders will be delayed for weeks.

NEXT WEEK:

P. 62

HOPPER FEEDS: BEST BET FOR SMALL PLANT AUTOMATION

The poor man's best bet in the hectic race toward automatic manufacturing. That describes these simple, yet ingenious devices. They've jumped output on some machines 400 pct, taken the monotony out of many other jobs.



CARBURIZING

This is the operation for which the Leland salt bath was originally purchased. Work is heated at 1650° for 30 minutes, oil quenched and washed. consistent, scale-free 0.005" case with surface hardness of R_{15N} 75/80 is obtained.









SIMULTANEOUS BRAZING AND CARBURIZING

Simultaneous brass brazing and carburizing cut cost from \$79 to \$13.11 per 1,000 parts, eliminated 3 handling operations, saved time. Average strength of brazed joints is 40,000 PSI, Case depth is 0.005"—0.007" with R_{15N} 80/85 surface hardness.

BRAZING

Ajax Salt Bath brass brazing of this assembly reduced costs from \$14.20 to \$9.10 per thousand-without considering the reduction in rejects from 25% to less than and elimination of 3 additional treatments previously needed with copper brazing.





HARDENING

SAE-1050 and 1065 cold rolled parts are hard-ened in the same Ajax bath used for the 3 other operations. Hardened parts will bend 45° before fracturing. The "pick-up" of a super-ficially carburized case is not objectionable.

Cost-Cutting Operations with One AJAX Salt Bath

... that saved \$37,000 the first 8 months!

Write for details outlining the G. H. Leland Inc., multi-use operation of its Ajax salt bath.

Let Ajax engineers demonstrate similar heat treating savings. You get actual proof on your own work samples in the Ajax Metallurgical Service Laboratories. No cost or obligation.

During its first 8 months on the job, this Ajax Electric Salt Bath Furnace saved \$37,000 in the plant of G. H. Leland, Inc., Dayton, Ohio. This saving was figured after deducting all operating costs and 20% annual equipment depreciation!

Or, to put it another way, the amazing versatility of the Ajax furnace installation enabled it to pay for itself in just a few months of use!

Not only does the Salt Bath handle all four heat treating operations described and illustrated above . . . but the Leland model shop uses it for odd jobs as well.

Work is scale free. Distortion is no longer a problem . . . and the firm's entire parts processing has been effectively streamlined.



AJAX ELECTRIC COMPANY

electric SALT BATH furnaces

Associated Companies: Ajax Electric Furnace Corp. • Ajax Electrothermic Corp. • Ajax Engineering Corp.

Morgan Quality in Action



MORGAN

Three Strand Continuous Rod Mill

Colorado Fuel and Iron Corp., Pueblo, Colorado

Morgan Mills meet the exacting demands of today's production. They have been doing so since the very first Morgan Mill went into action. Since 1889 Morgan has maintained the highest standards of design and construction - a fact attested to by the world-wide numbers of Morgan Mills in operation today.

MORGAN CONSTRUCTION CO.

ROLLING MILLS MORGOIL BEARINGS GAS PRODUCERS WIRE MILLS EJECTORS REGENERATIVE FURNACE CONTROL

MORGAN MORGAN MORGAN MORGAN MORGAN

Here's a 20-year service record of LOWER COSTS, EASIER SALES FOR USERS OF DEEP-DRAWING ARMCO ZINCGRIP STEEL

Products such as these have been made of Armoo ZINCGRIP Steel since 1936.









For more than 20 years drawn and severely formed parts like these have been made of Armco ZINCGRIP Steel at less cost in the shop. The reasons are: no flaking or peeling of the special hot-dip zinc coating, elimination of finishing after fabrication, and the production advantages of ZINCGRIP coils. ZINCGRIP also helps boost sales because of its attractive appearance and unbroken protection against rust.

In 1936, when Armco introduced ZINCGRIP, the first continuously zinc-coated sheet steel, designers and production men found it difficult to believe that a zinc-coated sheet could be drawn without damage to the coating. But a few trials—reverse draws, lock seams and roll forms—proved that the special coating on ZINCGRIP didn't flake or peel.

Proved in 20 Years' Service

More than 20 years' experience in hundreds of manufacturing plants has established this fact: Anything that can be done with sheet steel can be done with Armco ZINCGRIP. You don't have to baby it in the shop, and its formability gives you much greater freedom in design.

Twenty years have also proved that ZINCGRIP resists yellow rusting longer than ordinary galvanized. This, plus the smooth, attractive surface of ZINCGRIP, makes products easier to sell and keeps your customers satisfied.

ARMCO STEEL CORPORATION



1826 Curtis Street, Middletown, Ohio • Sheffield Steel Division • Armco Drainage & Metal Products, Inc. • The Armco International Corporation



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EDITORIAL

Let's Let George Do It - Again

◆ THE GREATEST Secretary of the Treasury since Andrew Mellon — George M. Humphrey — has produced a non-phony and legitimate government surplus. This accomplishment — weird in these times — is something to crow about.

It may be necessary for many fathers to explain to their offspring just what a government surplus is; that is, a real one. Offhand you could say it was spending less than you took in. But this time there is more to it than mere statistics.

There have been a few times in the last 30 years when there has been a small surplus. The reasons for those usually have been qualified or have been due to happenstance. The surplus last June 30 is the McCov.

If the President and Mr. Humphrey had listened to some politicians we would not have had a surplus. A tax cut at the wrong time — and there was heavy pressure for it — would have kept us in the red for another year.

What does this carefully planned surplus mean to American businessmen? For one thing, it means the government is trying to run its business on a sound basis. It also means that with Mr. Humphrey already promising himself another surplus for the fiscal year 1957, you can plan your spending and investing with much more confidence.

Balancing the budget is a phobia with the Secretary. His friendship with a lot of people at times was strained as he continued his single train of thought begun several years ago.

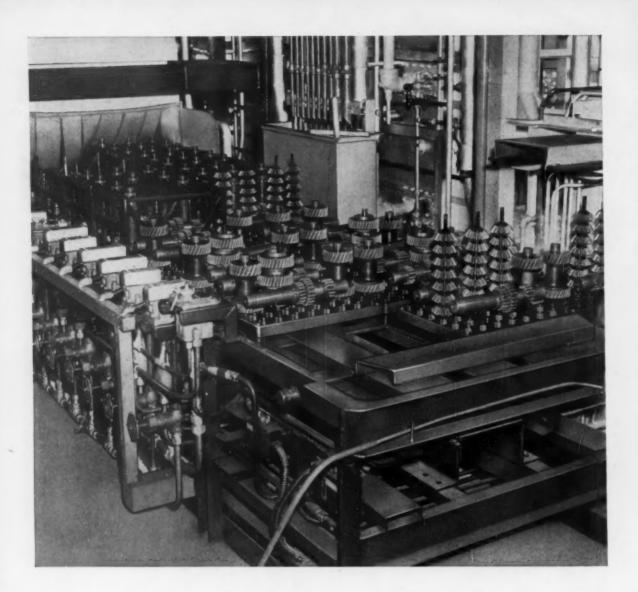
He has been accused privately of industrial mayhem and of putting the balance sheet ahead of defense needs. He has been reported as reverting to his old time mining habit of "bearing down hard." His prime purpose was to deliver a promise made to President Eisenhower.

The Secretary's job has just begun. He knows better than anyone else that he could not have interfered with proper defense spending of the Government, even if he had wanted to. His hard job now is to find ways and means of paying for a much greater defense bill which he knows is coming. But that will be duck soup for him.

So, let's let George do it - again and again.

Tom Camphee

EDITOR-IN-CHIEF



Surface® zoned gas carburizing toughens gears, cuts steel costs

The manufacturer of these heavy duty truck gears improved metallurgical properties and reduced material and labor costs when he adopted Surface zoned gas carburizing. Unique atmosphere manifolding enables him to limit surface carbon content (80% max.), get sufficient case depth, and still maintain good carburizing rates (530-900 net lbs./hr.). With the quality of Surface carburizing, he could use steels lower in alloy content.

Cases like this explain why 1,500,000 cfh of atmosphere gas are generated daily in Surface generators. For quality carburizing at competitive costs, check with Surface.

SEND FOR BULLETIN SC-172. SURFACE COMBUSTION CORPORATION . 2373 DORR ST., TOLEDO 1, ONIO

Surface Heat Treat, Steel Mill, Glass Divisions • Kathabar Air Conditioning Division Janitrol Heating and Air Conditioning Division • Janitrol Aircraft-Automotive Division



dear editor:

letters from readers

Art Lover

Sir:

We would like to have a copy of the article "Joining Stampings: Which Method Is Best For You" on p. 80 of the July 12 issue. If any back numbers of this series are available we would also appreciate receiving them.

As a new subscriber, we are quite impressed with your publication, and in particular the fine artistic arrangement of the various editorial pages. A boost for your Art Director. L. Armento, Armento Metal Arts Co., Buffalo, N. Y.

School Days

Sir:

Your special report on materials handling (How To Get More For Your Handling Dollar, May 24) is an unusually good overview of the field. So much so in fact that we want to use this as text material in our classes at the Center. We shall lend these reports to men from industry who enroll in our regular fall courses in materials handling. S. A. Larsen, Director, Materials Management Center, Wayne U., Detroit, Mich.

Reference Piece

Sir:

We recently received one copy of your special feature "Metal Cleaning and Finishing Handbook," which we feel is a very well presented and practical handbook on metal finishes. This handbook of looks so good that we would like to have several of them around the plant for reference. W. Reischer, Design Engineer, U-I Div., Burndy Co., Norwalk, Conn.

A few copies are still available.—Ed.

Eye-Opener

Sir:

That was a very fine and eyeopening article on ultrasonics which appeared in the July 26 issue.

Good work!

I'm following very closely the application of this new science to commercial heat treating. It would be a pleasure to hear from others who may be doing any work along this line. We are in touch with the University of West Virginia, but



Ultrasonic spot checking

are seeking other manufacturers or heat treaters who may be interested.

For instance, I am told that the Dalton Steel Corp., Cleveland, has accomplished some die improvement by the use of ultra sound waves; but as yet they have not disclosed their method.

Do you know of any others?

We will gladly co-operate in the development work as we are convinced it will prove very much worth while. A. S. Eves, Chief Field Engineer, Perfection Tool & Metal Heat Treating Co., Chicago, Ill.

Considerable progress has been made in the use of ultrasonics in connection with quenching media at Pioneer Central Div. of Bendix Aviation Corp., Davenport, Iowa. The Iron Age will carry a feature article based on Pioneer-Central's experience in this field in the August 30 issue.—Ed.



HIGH SPEED PRECISION BENDING with DI-ACRO* Hydra-Power Bender!

Simple and complex bends are readily formed and duplicated in many ductile materials with hydraulically operated Di-Acro Benders. The Bender can be delivered completely tooled for bending moulding, extrusions and other solid materials. Tooling can be made in your own plant if you prefer.

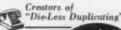
*pronounced Die-ack-ro



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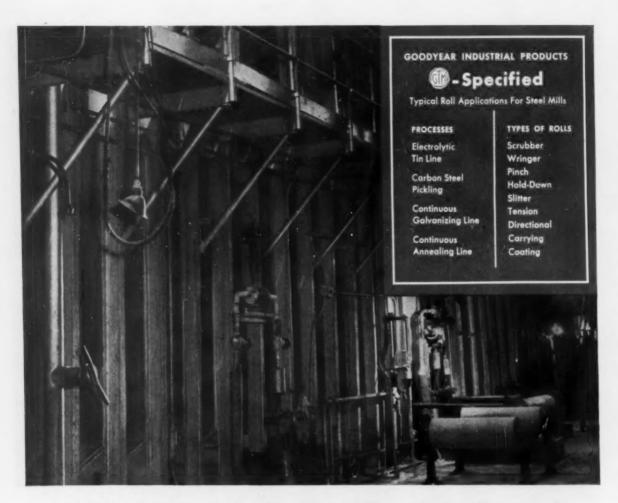
New catalog gives complete details on all hand and power operated Di-Acro machines.

Consult the yellow pages of your phone book for the name of your nearest Di-Acro distributor or write us.



O'NEIL IRWIN MFG. CO. 302 8th Ave. LAKE CITY, MINN.





G.T.M. More than doubles life of tin line rolls

ABOUT 18 MONTHS was considered excellent service for the rubber covered rolls in the plating compartments of this tin line. Abrasion and cutting plus constant immersion in approximately 200° F. sodium stannate solution were the life-limiting factors.

Then rolls specified by the G.T.M.—Goodyear Technical Man—were put to the test. They served an average of 3 years and 7 months—were worn

down only \(\frac{1}{16}'' \) in turning out 4,000,000 base boxes or 71,000 miles of tin plate. And with regrinding they'll be ready for many miles more!

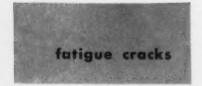
The G.T.M. may well have a similar answer to your rubber covered roll or other industrial rubber problems. Why not find out by contacting him through your Goodyear Distributor? Or write Goodyear, Industrial Products Division, Akron 16, Ohio.

RUBBER COVERED ROLLS by



THE GREATEST NAME IN RUBBER

It's SMART TO DO BUSINESS with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."



by William M. Coffey

Overseas Headlines

Our man has just completed a report on British technical journals based on a brief browsing through the editorial department.

Here's his report, pretty badly condensed.

"Just looked at the ads; quite fascinating. First thing noticed is at least a score of names familiar to readers of THE IRON AGE. Best to skip them except to question one firm that makes 'Bronx' plate bending rolls. Firm is in Lye, Worcs., so probably no connection with U. S. Bronx (N. Y.).

"Next obvious thing is virtual absence of case history copy in advertising, so familiar to readers of U. S. publications. Strong reliance on eye-catching photos and headlines. Ads are more of catalogue type. Some heads a bit hard to understand.

"Examples: Mains Frequency Induction Melting; Railway Wagons—All Types; Infra-Red Plant Overhead Saves Floor Space; Flexible Pipes by Dunlop; Pratt's Guillotines; Steelmakers Since 1776.

"Pause there, very significant date; reminds us that U. S. is rather young; THE IRON AGE (since 1855) even younger.

"Some not so hard to understand. just a bit unusual to American Samples: Heap's Patent Screwing Machines with Tangential Dies; Still Putting a Spanner in the Works?; Let's Drum it in Pinchin Johnson for Paint; Samuel Mercer & Co.—Steel Stockholders. And a rather unusual approach: How Are You Off for Springs?"

We concede our man's report is not very complete; merely accurate. Not intended to be critical either. Fact is our British correspondent, Mr. Fred H. Harley, is editor of one of the magazines our man culled. If we can't translate any of these headlines which may baffle readers, Mr. Harley will do so posthaste.

Puzzlers

A king, his daughter and a page were imprisoned in a tower, in which the only opening to the outside was a window 100 ft high. Outside the window was a rope a little more than 100 ft long, which went over a fixed pulley.

To each end of the rope was attached a large basket, so that when one basket was on the ground, the other basket was opposite the window. A person could sit in either basket, but could not pull either part of the rope, or help another in the basket. In short, either basket could be made to ascend only by overbalancing it.

The king weighed 195 lb, the princess 105 lb, the page 90 lb. They found a chain that weighed 75 lb.

When any person was in either basket, the weight in the descending basket could exceed that in the other basket by only 15 lb, otherwise the descent would be too rapid Furthermore, only two persons, or one person and the chain could be in the basket at any one time.

How could they manage it so that all three could escape and take the chain with them?



"Good Heavens, man, not magazines! I said order a ton of magnesium!"



__ CHIEF INSPECTOR, THE CINCINNATI GEAR CO.

Several years ago we ran an ad entitled "Ears for Gears" that produced a lot of comment. The unusual title was explained in the copy, in which we told how we can individually sound check gears for minimum noise level. This checking is done on ultramodern testing equipment, under specified load and R.P.M., measuring the decibel tolerances of the individual gears. Not only does this help us produce silent-running gears, but it is also one example of the extensive checking and testing to which we subject our gears, to be sure of maintaining our reputation for delivering only good gears.

This checking and testing, which is the responsibility of my department, is one of the most important functions in our plant. It's always possible for a "rotten apple" to slip into the barrel, but it's essential that it be found and removed before shipping. That's why my department can't afford to make any mistakes, or compromise in any way. Top management realizes this; they provide us with the best available equipment, and I report directly to our President (eliminating any possibility of "shop influences" in our testing standards). As a result, our customers have the assurance that when they send us an order they'll receive only the best custom gears obtainable.

THE CINCINNATI GEAR CO.

"Gears—Good Gears Only"



HEAD WORK...

saves time
... controls
and speeds
production!

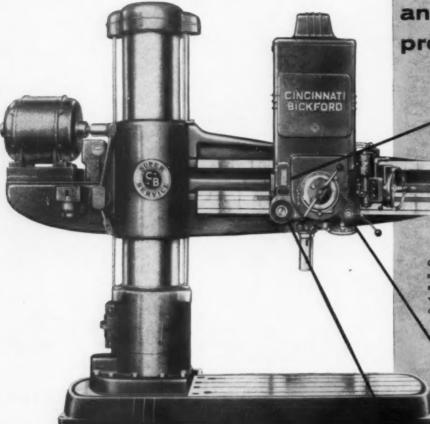


Chart guides the operator in preselecting speeds and feeds for succeeding operations. It provides a permanent record of tool diameter, speed and feed.



This NEW modern head gives an accelerated production and an increase in accuracy of performance ... the greatest advance in simple and positive control in Radial Drill history.

Two convenient direct reading dials control the automatic shifting of sliding gears. While the tool is cutting, merely set the dials to the speed and feed for the next operation. As the spindle is stopping for inserting the next tool, the shifting is done hydraulically . . . directly, quietly and quickly. No other operations—no loss of time. Write for catalogs.

Hydraulically pre-selects all 18 feeds. Positive geared tap leads and feeds are quickly pre-set.



Hydraulically pre-selects all 36 speeds. Speeds and tool diameters are shown in large easy to read figures.

BICKFORD



RADIAL AND UPRIGHT DRILLING MACHINES

CINCINNATI BICKFORD DIVISION

SIDDINGS & LEWIS MACHINE TOOL COMPANY

OAKLEY, CINCINNATI 9, OHIO, U.S.A.

dates to remember

AUGUST

Western Electronic Show and Convention—Aug. 21-24, Pan Pacific Auditorium and Ambassador Hotel, Information, WESCON, 344 N. LaBrea Ave., Los Angeles.

SEPTEMBER

Metal Powder Assn.—Fall meeting. Sept. 7-9, Homestead, Hot Springs. Va. Society headquarters, 420 Lexington Ave., N. Y.

American Institute of Chemical Engineers—Fall meeting, Sept. 9-12, William Penn Hotel, Pittsburgh. Society headquarters, 120 E. 41st, N. Y.

EXPOSITIONS

The Packaging Machinery Manufacturers' Institute, Sept. 11-14, Cleveland.

Assn. of Iron & Steel Engineers, Sept. 25-28, Cleveland.

Metal Show-Oct. 8-12, Cleveland.

Society of Automotive Engineers—National tractor meeting and production forum, Sept. 10-13, Hotel Schroeder, Milwaukee. Society headquarters, 29 W. 39th St., N. Y.

American Die Casting Institute — Annual meeting, Sopt. 11-13, Edgewater Beach Hotel, Chicago. Society headquarters, 366 Madison Ave., N. Y.

Porcelain Enamel Institute — Annual meeting, Sept. 12-14, Broadmoor Hotel, Colorado Springs, Colo. Society headquarters, 1145 19th St., N. W. Washington 6, D. C.

American Society for Testing Materials
—Second Pacific area national meeting and apparatus exhibit, Sept. 16-21,
Hotel Statler, Los Angeles. Society
headquarters, 1916 Race St., Philadelphia.

Eleventh annual international instrument-automation conference and exhibit, Sept. 17-21, New York Coliseum, N. Y. Society headquarters, 1319 Allegheny Ave., Pittsburgh.

American Hot Dip Galvanizers Assa.— Semi-annual meeting, Sept. 20-21, Greenbrier Hotel, White Sulphur Springs, W. Va. Assa. headquarters, 1806 National Bank Bldg., Pittsburgh.

Steel Founders' Society of America— Fall meeting, Sept. 24-25, The Greenbrier, White Sulphur Springs, W. Va. Society headquarters, 606 Terminal Tower, Cleveland.

The Material Handling Institute—Fall meeting, Sept. 24-26, The Greenbrier, White Sulphur Springs, W. Va. Society headquarters, 813 Clark Bldg., Pittsburgh.



 $\begin{array}{c} \textbf{SPECIAL HAZARDS}-\text{like industrial}\\ \text{mixing vats shown in the diagram}\\ \text{above}-\text{deserve special fire protection}\ldots\text{the } \textit{custom-engineered}\\ \text{kind}\\ \text{of fire defense that you get with a}\\ \text{Kidde } \text{CO}_2 \text{ Fire Extinguishing}\\ \text{System!} \end{array}$

Fully automatic, the Kidde system provides 'round-the-clock protection... insures full-time security even in case of outside power failures. Rate-of-temperature-rise detectors spot the first sign of flame, and cause Multijet nozzles to discharge fire-smothering carbon dioxide that stifles the blaze in seconds. At the same time, the Kidde system

switches off fans and machinery and sounds an alarm.

CUSTOM-ENGINEERED

FOR INDUSTRIAL MIXERS!

All moving parts of a Kidde system are self-enclosed to prevent accidental discharge. Easy-to-read visual indicators show at a glance whether the system is "set" or "released." And Kidde Directional Valves let you guard more than one hazard from the same cylinder bank, providing completely versatile fire protection.

Don't settle for anything less than the *best* in fire protection. For more information about your specific problem, write Kidde today.





Walter Kidde & Company, Inc. 849 Main Street, Belleville 9, N. J.

Walter Kidde & Company of Canada Ltd., Montreal—Toronto

OPEN FOR BUSINESS



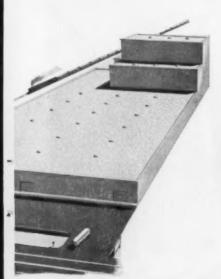
New refractories plant at Columbiana, Ohio, to give better-thanever service to the steel industry!

THE NEW Kaiser Chemicals refractory plant at Columbiana, Ohio has now begun production of steel furnace refractories.

Located on a 100 acre site adjacent to the main line of the Pennsylvania Railroad and the Ohio-Pennsylvania Turnpike, the new Columbiana plant assures rapid rail and truck transportation to steel producers in the Midwest and East. Already serving the nation's steel industry from three plants in California, this new Kaiser Chemicals facility means new production to meet the increasingly heavy demand for Kaiser refractories. The new Columbiana plant will manufacture basic brick, mostly of the Periclase Chrome and Chrome Periclase types in addition to Permanente Ramming Mixes for refractory furnaces.

All these refractories are especially designed for peak performance in specific applications in open hearth and electric steel furnaces. In fact, for more than 12 years Kaiser Periclase Chrome and Chrome Periclase Brick have set the standard of performance for the industry. That is why more and more steel producers regard them as the most dependable refractories available today!

If you have a problem in your mill which might be solved by the prompt delivery of superior quality, dependable retractories, why not get in touch with us?



For more information call our nearest Sales Office: Kaiser Chemicals Division, 1924 Broadway, OAKLAND 12, Calif. . . . 3 Gateway Center, PITTSBURGH 22, Pa. . . . 518 Calumet Bldg., 5231 Hohman Avenue, HAMMOND, Indiana.

To obtain free copies of Kaiser Chemicals product literature write Kaiser Aluminum & Chemical Sales Inc., 1924 Broadway, OAKLAND 12, California, Dept. S6112.

Kaiser Chemicals

Pioneers in Modern Basic Refractories

Refractory Brick & Ramming Materials • Castables & Mortars • Magnesite

Periclase • Deadburned Dolomite

LOOKING FOR NEW IDEAS? GO SEE

THE 1956 IRON & STEEL EXPOSITION CLEVELAND PUBLIC AUDITORIUM

SEPTEMBER 25-28

No Admission Fee • No Registration Charge Open to Men of the Iron and Steel and Allied Industries

* Tell-ALL Exhibits

More than 200 companies that supply materials, equipment and services to the Steel Producing Industry will reveal their latest advances in eye-catching, informative displays and demonstrations.

→ Vital Technical Sessions

Four full days of intensive technical sessions offer a liberal education in "What's New" in steel plant operation, methods, planning, maintenance and many other pertinent subjects.

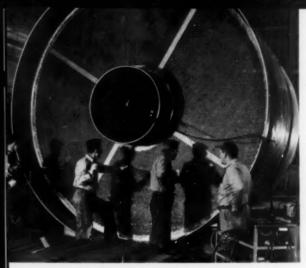


The Industry's Most Specific Show!

1956

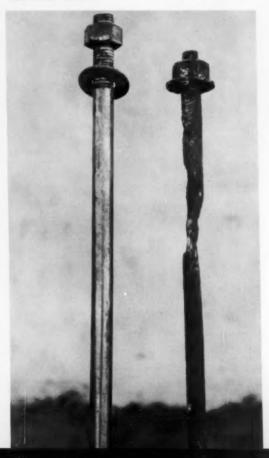
For additional information, write

Association of Iron & Steel_Engineers, 1010 Empire Bldg., Pittsburgh 22, Pa.



FOR HIGH TEMPERATURE STRENGTH. This looks like a sieve, but actually it is a Stainless Steel plate punched with 25,400 holes, and it makes up the end plate of a chemical plant heat exchanger. After the tubes were inserted the exchanger was placed in high-temperature, intensely corrosive 24-hour service. It was made by the Nooter Corporation, St. Louis.

FOR CORROSION RESISTANCE. Rare Earths, Inc., produces such valuables as cerium, lanthanum and praseodymium by means of an elaborate chemical separation process. In the filter press, corrosion destroyed carbon steel plate rods in six months. Stainless Steel rods were installed over six years ago, and are still in fine condition.



NOTHING can equal Stainless Steel

for its combination of desirable properties

No other design material can match Stainless Steel in its combination of desirable properties: corrosion resistance, strength and hardness, beauty, cleanability and easy fabrication. When seeking a source of supply, remember that United States Steel offers you the widest range of types, finishes and sizes.



FOR TAKING A BEATING. These are 8th grade students from Dormont, Pa., public schools in a domestic science class. The sink tops were made by Pride Mfg. Co., Pittsburgh, from USS Stainless Steel. Says Pride, "These Stainless sink tops are ideal for school use. We've seen some 20-year-old sinks that still look as good as new."

UNITED STATES STEEL CORPORATION, PITTSBURGH * AMERICAN STEEL & WIRE DIVISION, CLEVELAND COLUMBIA-GENEVA STEEL DIVISION, SAM FRANCISCO * NATIONAL TUBE DIVISION, PITTSBURGH TENNESSE COAL & HIGHD DIVISION, FAIRFIELD, ALA.

UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS

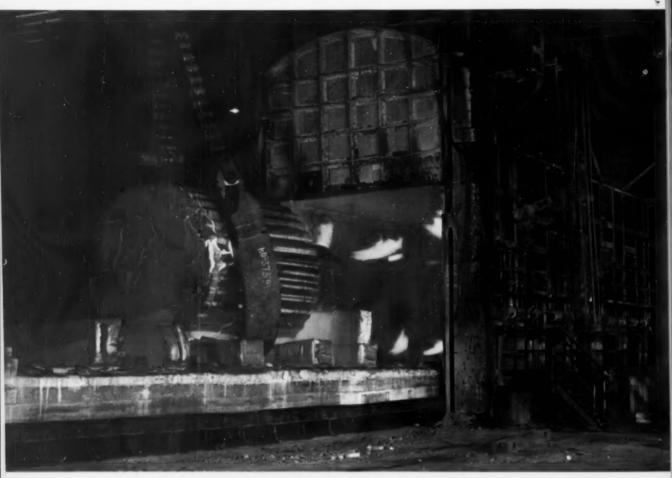
USS STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS
PIPE · TUBES · WIRE · SPECIAL SECTIONS



UNITED STATES STEEL

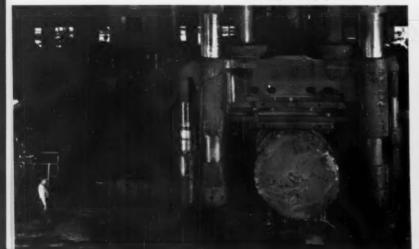
"I think forging is an art"



After about three days of heating, crane takes hot ingot to press.

Preliminary forging.

Basic shape of forging is determined here.



Secondary forging.

This is water wheel shaft for hydro-electric plant.





says William C. Steele

U.S. Steel Superintendent of Forging and Heat Treating



Forging an ingot is somewhat like sculpturing a statue by means of sema-phore signals that you give to a lurching robot. Using only hand instructions, the forge shop pressman must blend the action of giant cranes, manipulator machines and the press itself. Working only with the immense, blunt dies of the press, he must knead the steel to develop its maximum strength, then squeeze it into the most intricate shapes, frequently to a quarter-inch tolerance.

Truly, this is an Art.

At our Homestead Forgings Division, William Steele has complete charge of the production floor where USS Quality Forgings are forged and heat treated. He has worked in the

Division for 28 consecutive years, producing such things as special armor plate, compound-curved wind tunnel parts, hollow sleeves, precision rolls and machinery parts so complicated that you'd never believe they could be forged from a monstrous ingot of solid steel.

If there is any secret to USS Quality Forgings, it lies in our combination of superior steel quality, the finest processing equipment, and most important: skillful, completely reliable men like William Steele.

Please address inquiries or requests for our free 32-page booklet on USS Quality Forgings to United States Steel, Room 5419, 525 William Penn Place, Pittsburgh 30, Pa.

USS QUALITY IFORGINGS



Heavy machinery parts—carbon, alloy, stainless

Forged steel rolls and back-up roll sleeves

Electrical and water wheel shafts

Specialty forging of all types

UNITED STATES STEEL

Final inspection. Piece has been heat treated, machined and subjected to dozens of critical tests. Now, it's a USS Quality Forging.





tiny or tremendous ...



For best results... PUT IT ON A BLANCHARD!



Blanchard No. 18



Blanchard No. 42-84

There's a Blanchard for every surface grinding job, in a broad range of sizes. For example, the Blanchard No. 18 grinds non-magnetic transistor elements (upper left) .006" thick, to a tolerance of .0005" with good finish. This job, which involved .006" to .008" stock removal per side, was held on special fixture plates.

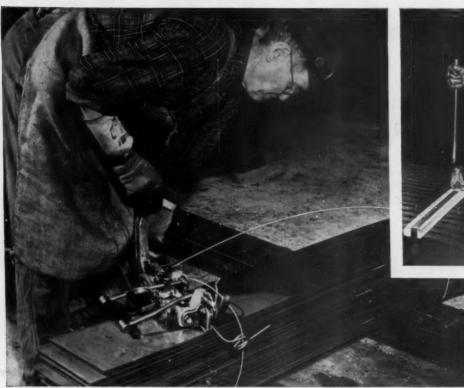
At the other end of the scale, a huge Blanchard No. 42-84 Grinder grinds a turbine housing (upper right) which measures 83" across the corners, and is 28" high. This housing, ground after rough machining, required .020" stock removal. Both this piece and its mating part were ground to a steam-tight joint.

Whatever you're grinding—be it tiny watch parts, giant steel plates, or anything in between—there's a Blanchard designed to do the job speedily and accurately.

Ask for details on the 15 standard Blanchard models.



Send for free copies of "Work done on the Blanchard", fourth edition, and "The Art of Blanchard Surface Grinding".



Strapping truck frame side bars with USS GERRARD Steel Strapping.

Steel blanks being secured with 10-gauge USS GERRARD Round Steel Strapping.

USS GERRARD engineers the strapping method to the particular job it has to perform

A. O. Smith's Automotive Truck Frame Division produces frames, side members, and component parts for trucks and buses. Until five years ago, the division shipped these parts loose—in railroad freight cars. It found, however, that it could cut costs, improve handling, and speed up service considerably by using open trucks—with the shipments held securely in place by USS Gerrard Steel Strapping.

The Automotive Division chose USS Gerrard Strapping because of the "exceptional service Gerrard gives, in engineering each strapping

job to make sure it is right." Here are some examples of USS GERRARD engineering service to A. O. Smith:

1. When snow and ice, accumulating on bundles, expanded the load and cracked the Flat Strapping, USS GERRARD solved the problem with Round Strapping and a specially devised tension tool that limited strapping tension to 3,000 pounds.

2. When rust appeared on metal products under the strapping, GERRARD immediately provided a painted and waxed strapping which not only stopped rust, but helped equalize strapping tension by reducing friction.

3. When Flat Strapping, dragged across floor, became oily and dirty, it

sometimes had a tendency to slip after it was sealed. To counteract this, USS GERRARD engineers developed a special cut-type seal which indented the seal and strapping, making slippage impossible. Indentations were turned so that they could not mar the product.

Many more examples could be cited to illustrate just how USS Gerrard's engineers are on the job at all times, working for solutions to your packaging tying problems. But why not see for yourself? Bring your particular problem to our engineers—any time. If there is a solution, they'll find it. And at no cost to you.

GET THIS NEW CATALOG — NOW! 36 pages of photographs, descriptions, facts and figures on all USS GERRARD Steel Strapping and associated equipment.

GERRARD STEEL STRAPPING DIVISION, UNITED STATES STEEL CORPORATION
GENERAL OFFICES: CHICAGO, ILLINOIS

USS
ERRARD
FACEAGINE
PACEAGINE
PACEAGINE
Round and Flat
STEEL STRAPPING

UNITED STATES

Gerrard Steel Strapping 4711 S. Richmond St., Chicago 32, III.

Please send me, free of charge, the new 36-page GERRARD Blue Book of Packaging.

Name

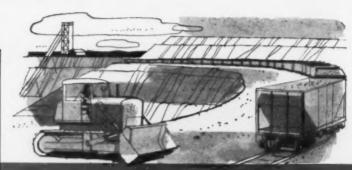
Company

City State

From Mine to Mill.

Allis-Chalmers Equipment serves in every part of the Steel Industry... Dependably, Economically

For more than three quarters of a century, Allis-Chalmers has served the steel industry - supplying the equipment needed to produce top quality steel . . . the manufacturing "know-how" to meet heavy-duty operating conditions...the pioneering spirit to keep up with the changing requirements of the industry. Allis-Chalmers machines are employed, not just in one phase, but all through the steel-making process. For complete information on how Allis-Chalmers can help solve your machinery problems, consult your Allis-Chalmers district office or write Allis-Chalmers, Milwaukee 1, Wis.



MINES ...



Crushers, grinding mills, vibrating screens engineered and manufactured by Allis-Chalmers crush the ore-bearing rock, grind it to specified size, size, and wash metallic ores, stone and coal.



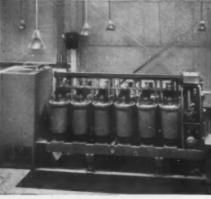
Allis-Chalmers pumps, motors, Texrope drives are in wide use throughout the metal industry because of their long life characteristics, low maintenance requirements and great versatility.

Regulex and Texrape are Allis-Chalmers trademarks.



ELECTRIC FURNACE...

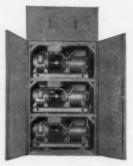




Mercury-arc rectifiers furnish constant voltage do power for material handling in open hearth and other mill operations and for mine haulage. Variable voltage units are supplied for supporting main roll drives.

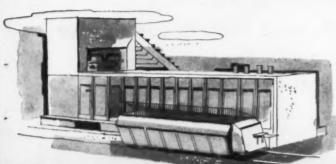


Allis-Chalmers arc furnace transformers are of well-balanced design and extra heavy duty construction — proven in 25-30 years of repeated daily short-circuits in electric furnace operation. Regulex control balances arc current with arc voltage, almost instantly — maintains desired arc condition automatically.



ALLIS-

. It's Allis-Chalmers







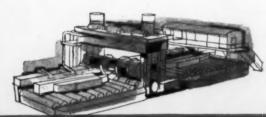
Booster, exhauster or combination service requirements are met by Allis-Chalmers blowers. Photo shows four 23,000cfm, 5100-rpm, 3.5-psig centrifugal exhausting blowers in a western steel mill.



Blast furnace blowers furnished by Allis-Chalmers meet blast furnace requirements. The 75,000-cfm, 30-psig centrifugal blower shown here has been in service since 1942. It is driven by an 8500-hp steam turbine.



Allis-Chalmers axial blowers are designed for high efficiency blast furnace duty. They are smaller, easier to install - save \$50,000 or more in steam per year. A-C also builds constant efficiency rotary compressors.







Motor room photograph shows Allis-Chalmers switchgear, control, constant and variable voltage motor-generator sets, Regulex m-g sets, liquid rheostat, and twin-drive motors in use in a midwestern steel plant.



Hot strip, cold reduction, temper, rod and wire mills, and annealing and pickling lines employ Allis-Chalmers control, power equipment and drive motors for dependable operation.

Other Equipment

Besides the power utilization and conversion equipment illustrated, Allis-Chalmers also supplies power generation and distribution requirements from mine to mill.

For power generation, A-C builds steam turbinegenerator units, surface condensers, water conditioning equipment, pumps, motors, and control. Also hydraulic turbines, generators, governors, and valves. For power distribution, A-C furnishes transformers, voltage regulators, circuit breakers, switchgear, and substations.

Throughout this wide range of products, you can depend on Allis-Chalmers for equipment engineered to meet your exact needs.

CHALMERS



A-4907

MUELLER BRASS CO.

brass and bronze forgings help insure

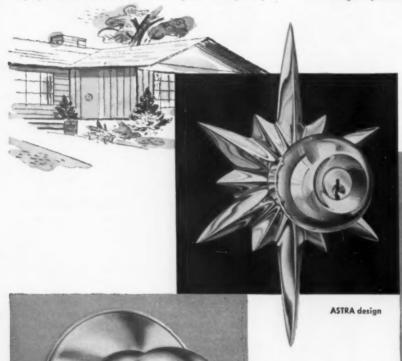
dependability and lasting jewel-like

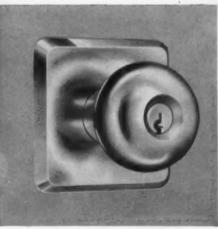
finish of distinctive

Smart styling, handsome appearance and durability have been neatly combined by the Schlage Lock Company of San Francisco in their line of lock designs for residential and commercial use. Many important parts of these lock sets are brass and bronze forgings made by the Mueller Brass Co. The beautiful natural color, corrosion resistance, and inherent dependability of these forgings make them ideal for this purpose. In addition, the high degree of surface smoothness makes possible an exceptionally lustrous finish as well as a perfect plating surface when required. Then, too, the use of forgings has reduced costs, cut finishing time and greatly re-

duced the number of rejects when compared to the sand castings that were formerly used.

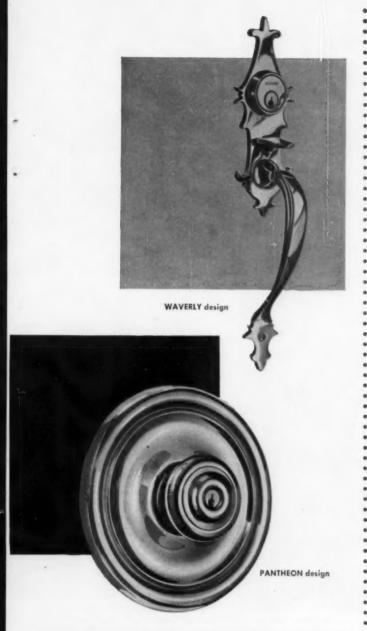
Whether you manufacture decorative hardware where finish is of prime importance or rugged assemblies that must stand up to bruising everyday punishment, it will pay you to investigate Mueller Brass Co. forgings. Strong, long wearing brass, bronze or aluminum parts, forged to your exact specifications under exacting statistical quality control standards can help you reduce costs, improve performance, and give you a better looking product. Write for our engineering manual (No. H-58565) . . . or call in one of our engineers to investigate possible forging applications in your products.





MONARCH design

MERCURY design



• WRITE TODAY FOR THE ENGINEERING MANUAL YOU NEED







by FRANK M. LEVY
Vice-President and Director of Research

Last week one of our sales engineers was at the home office and we were talking about one of his customers in the East who manufactures milling machines which are being used for milling aircraft spars. We are supplying gibs, slide bars and wear strips to this company made of our "600" series bearing metal in rectangular rod form. The material formerly used was aluminum bronze" cast bars which they could only obtain in 36" lengths. Their engineering department estimates that costs have been reduced 50% on this component. Machining time has been reduced and impregnation of porous castings has been eliminated.

Our sales representative was curious about my experience with "600" in other applications such as this. Oddly enough, our own plant has been a pretty good proving ground. In our extrusion department, for example, we have gotten exceptionally good service from slides made of "600" and used on the die heads which are subject to pressure and extremely rough usage.

Bob Irwin of our forging department reports that the "600" strips he has used for lining the ways of our big forging presses have proved far superior to the bronzes which were original equipment. The bronze strips squashed out after protracted running. More important, the "600" strips last 10 times longer before replacement is necessary.

In our copper tube fabricating department we have a lot of automatic equipment for the production of formed tube shapes like tees and ells used in the plumbing industry. On one of the tube benders, there was no provision made for replacing worn forming slides. Our Maintenance Department reworked the machine using "600" strips as replaceable forming slide inserts. The bender is now a far more efficient machine. Because of the long life of "600", downtime on this machine has been practically eliminated.

While we were talking about these uses in our own plant, it brought to mind some other instances where the exceptionally good wearing properties of "600" have been established. A Cincinnati lathe manufacturer uses "600" in the form of counter sunk hexheaded screws on wearing strips used on lathe carriages. When the strip wears to the retaining screw the ways will not be scratched.

According to their own records, all other materials which they had tested proved unsatisfactory for the job. Another maker of precision lathes and milling machines found that after a year of exhaustive tests, the "600" metal that was used as nuts on compound slide screws outlasted competitive metals at an approximate ratio of 3 to 1 at an estimated saving of 30%.

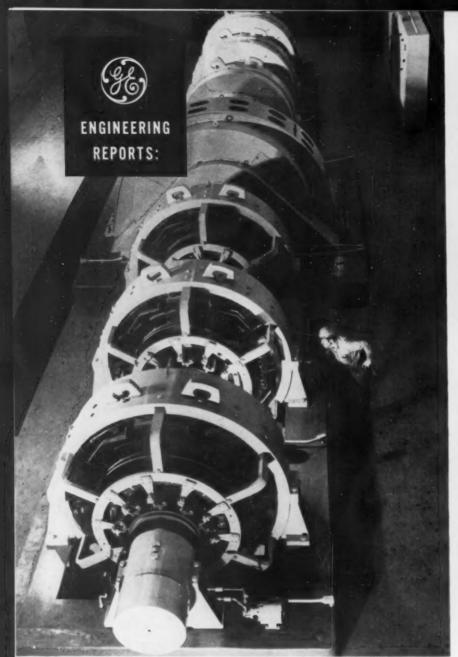
Sliding surfaces on all kinds of machinery have different wear characteristics, as you have undoubtedly found. If you have any problems involving gibs, slide bars or wear strips that are proving troublesome, why not drop me a line or send a part print and we'll be glad to study it and make the proper recommendations.

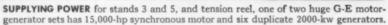
*We manufacture 4 grades of wrought aluminum bronze.

MUELLER BRASS CO.

PORT HURON 24, MICHIGAN

185







AUTOMATIC THICKNESS CONTROL system includes stand 1 X-ray indicator (left), X-ray gage (center). Operator's control cabinet is shown at right.



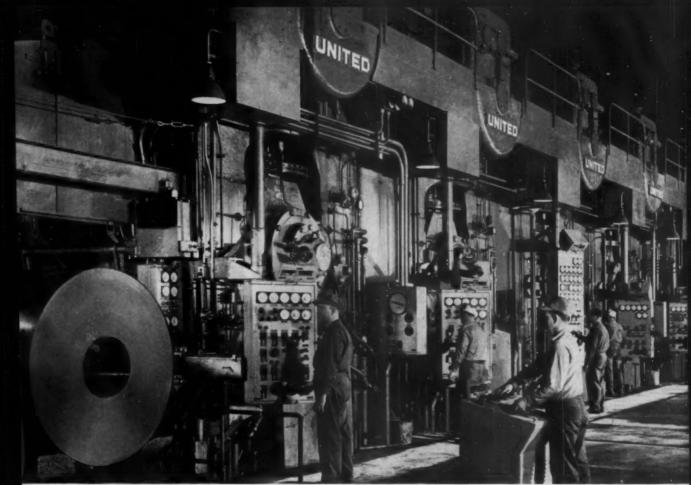
closer Tolerances at higher speeds are obtained with thickness control system. Gage control panel shown above.

FAST acceleration, balanced speed regulation are obtained using specially designed, low inertia, d-c drive motors, designed to fit mill's rigid space requirements.



ACCURATE system control is provided by main-drive d-c control equipment. Designed by G.E. for cold mills, panel includes memory fault finder, magnetic and rotating amplifier regulating circuitry.





CHIEF OPERATOR'S control is located at stand 3, speed control at stand 5, on new 5-stand tandem cold strip mill,

At Weirton Steel: 28,000 hp Drives World's Most Powerful Cold Strip Mill

General Electric X-ray controlled cold mill drive system is world's fastest

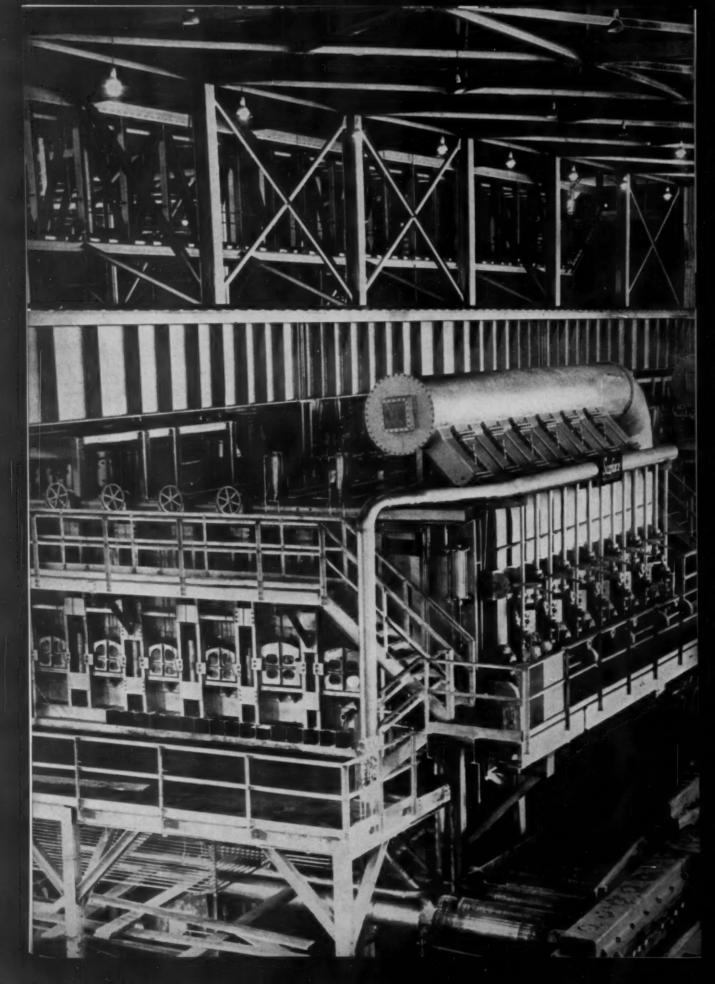
National Steel Corporation's Division, Weirton Steel Company, Weirton, West Virginia, recently started up their new 5-stand tandem cold mill with a General Electric d-c drive system containing the world's greatest concentration of cold mill drive horsepower. With the new General Electric automatic X-ray gage control system, Weirton Steel Company's cold mill is another significant example of automatic production providing higher quality steel, with closer tolerances, at higher rolling speeds.

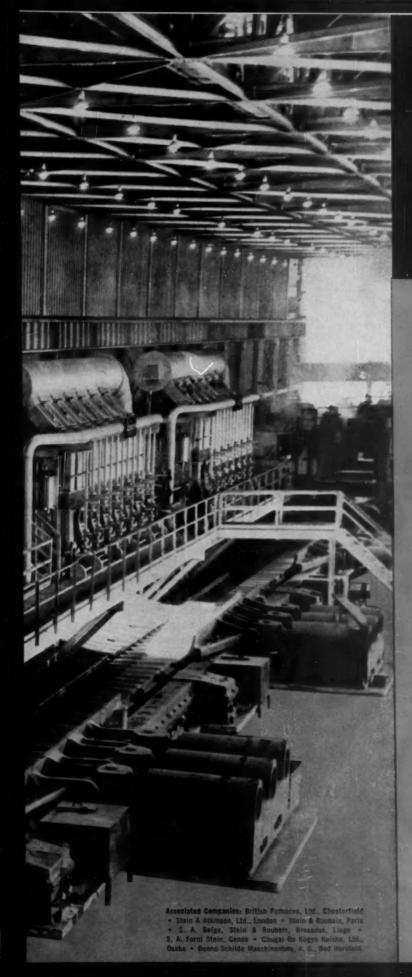
THE AUTOMATIC GAGE control system, one of the newest General Electric developments for the steel industry, has two basic elements: (1) a course regulating system to correct errors by means of the stand 1 screwdown motors, with the X-ray gage measuring stand 1 steel thickness; and (2) a vernier system controlling stand 5 drive motor speed, with the X-ray gage measuring finished strip thickness. Some of the highlights of the drive and control system are shown on these pages.

FROM INITIAL PLANNING, General Electric engineers worked closely with Weirton personnel and the United Engineering and Foundry Co. to help design, install and start up this engineered system that helps Weirton meet increased steel production requirements. Get complete information on the latest General Electric equipment and methods from your Apparatus Sales Representative at the nearest General Electric Apparatus Sales Office, early in your planning.

Engineered Electrical Systems for the Steel Industry







200 TONS AN HOUR

CONTINUOUSLY

200 tons of steel slabs are heated to rolling temperature every hour, continuously, in each of these Surface monsters—world's largest slab furnaces.

No other furnace today can list all of these features:

- Cantilever skid supports* permitting unobstructed combustion space for underfiring.
- 2 Furnace lines and burner design which provide high heat input from the moment the slab enters the furnace.
- Built-in control[®] to prevent intermingling of gases from upper and bottom zones, providing better control of heat application, and preventing overheated slab end.
- 4 Anticipatory control which reduces temperature head when rate of slab discharge decreases.
- 5 Air preheat up to 1100°F.
- 6 Television signal to pusher pulpit, informing operator of the exact position of the leading slab.

About the only conventional feature in these giants is the fact that the slabs are pushed in one end and out the other.

This is another demonstration that, at Surface, unconventional thinking and conventional experience are a productive team for the steel industry. Surface Combustion Corporation, Toledo 1, Ohio.

*patents pending

Surface



Operates at same speeds forward or reverse.

Cuts straight lines, circles, square or bevel kerfs.

Adaptable to many automatic welding applications.

Now constant running motor and 3-position torqueconverter transmission of new Model VU-120 bring you speeds from 0 to 180" per minute—forward and reverse—without loss of power at low speeds. In neutral position, machine free wheels so you can set up easily and quickly. Wide speed range enables you to adapt travel carriage to many automatic welding applications, using either submerged or inert arc.

You get remarkable accuracy from the Model VU-120. Floating rear caster practically eliminates side tilt and

wobble. There's no "creeping"—shut off machine and it stops instantly.

set-ups each holder can handle multiple torches.

Universal torch holder accommodates any model victor machine cutting torch, with or without gear rack. Two torch holders can be used if desired. Case is pre-drilled for extra torch holder, side guide roller, or counterweight.

Try the fast-operating VU-120. Ask your victor dealer for a demonstration on your job NOW . . . or write us for descriptive Bulletin 353.



For maximum efficiency and safety, use genuine Victor tips and parts

VICIOR EQUIPMENT COMPANY

Mfrs. of welding & cutting equipment; hardfacing rods, blasting nozzles; cobalt & tungsten castings; straightline and shape cutting machines.

31

844 Folsom St., San Francisco 7 • 3821 Santa Fe Avenue, Los Angeles 58

ONE OF A SERIES ...

What makes a cylindrical roller bearing good?

The RIGHT ROLLER DESIGN and QUALITY CONTROL

The design and quality of the rollers play a large part in the performance of a cylindrical roller bearing. At right are some of the vital factors which must be considered.

All these factors are scrupulously controlled by the most modern precision equipment to insure maximum performance and life for every HYATT Roller Bearing. You'll find more details in HYATT General Catalog No. 150, or your nearby HYATT Sales Engineer will gladly help you choose the type best suited to your requirements. Remember, HYATT is America's first and foremost maker of cylindrical roller bearings. Hyatt Bearings Division of General Motors, Harrison, New Jersey.



DISTRIBUTION OF LOAD WITHIN THE BEARING

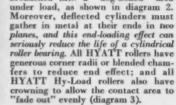


Rollers are subjected to load only while in the "load zone," with maximum load while on the line of action of the bearing load, as shown in diagram I. The theoretically perfect "load zone" extends from -90° to +90° from zone" extends from -90° to +90° from the line of action, but this is neither ractical nor necessarily desirable. Under normal loadings, the actual "load zone" may range from 90° to 120°, de-pending on load and mounted internal clearance. This distributes the load so the load on the heaviest-loaded roller is approximately 5/N times the bearing load, where N is number of rollers.

2. DISTRIBUTION OF LOAD WITH-IN ROLLER'S AREA OF CONTACT

A cylinder deflects locally in the region of engagement when loaded between flat plates. The plate also deflects, so the original line of engagement is broadened into a "dog-boned" area







The unit load on any roller is uniformly distributed axially except at the crowned ends where it drops off



summation of unit loads represented by area A is the total roller load. This same load under misalignment results in an area equal to area A; but maxi-mum unit load is considerably greater and the bearing will have a shorter life than a properly aligned one. When the same total load is applied to an un-crouned roller, an even higher unit load results. This demonstrates the value of crowning when misalignment occurs.

EFFECT OF ROLLER QUALITY ON BEARING PERFORMANCE

Lack of roller quality control has a very adverse effect on performance: 1. A roller with excessive taper tends to





uneven load distribution and abnormal temperature rise. 2. A roller with excessive end square tends to noisy bearing performance. 3. A roller with excessive two-point out-of-round tends to cessive non-point out-of-round tends to poor segregation and poor bearing life. 4. A roller with excessive three-point out-of-round tends to noisy bearing operation. 5. A roller with poor finish tends to wear on all operating surfaces and noisy operation. 6. A bearing with excessive roller-to-roller diameter varia-

tion tends to poor bearing life. 7. A bearing with excessive roller-to-roller length variation tends to poor thrust capacity, abnormal temperature rise. The sign of QUALITY in Die Casting Machines



HOT AND COLD CHAMBER MODELS IN ALL TONNAGES

AUTO-LITE

...one of many quality die casters who have re-ordered Lake Erie machines again and again.

The sign of **QUALITY** die castings produced on 83 Lake Erie machines

WThe (Continental) Mark II's grille is made by The Electric Auto-Lite Company, Toledo, Ohio. Ford engineers picked this company because it could maintain the quality standards they were seeking.

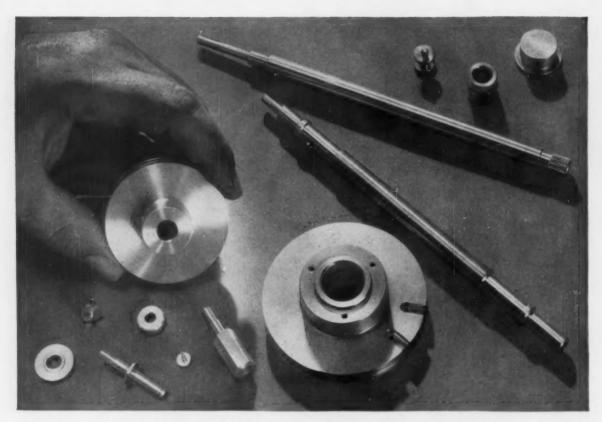
STEEL Magazine-May 28, 1956

LAKE ERIE®

LAKE ERIE ENGINEERING CORPORATION, 368 Woodward Ave., Buffalo 17, New York

August 16, 1956

29



TYPICAL PARTS made of Alcoa Aluminum Screw Machine Stock at Dictaphone Corporation include long, slender feed screws that used to present thread-

ing problems in steel. Tolerances of three tenths are not unusual, High stock removal is routine with aluminum.

HOW DICTAPHONE CORPORATION DESIGNS FOR SALES WITH ALCOA ALUMINUM SCREW MACHINE STOCK

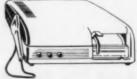
The day the dictating machine left the office and started traveling with the salesmen, surprising things happened. At Dictaphone Corporation, for example, their famous Time-Master dictating machine went on a reducing diet. From 20 pounds, this versatile machine shrank to 12.4 pounds. Aluminum screw machine parts played a major role in making the Time-Master light and portable. But, most important are the other advantages that came to Dictaphone with their switch to Alcoa® Aluminum. "Problem parts" in stainless and mild steel suddenly became routine when Alcoa Aluminum Screw Machine Stock was used. Tool and wheel life increased. Rust problems ended.

While weight reduction may not be the primary consideration for your product, the economic savings and many added advantages of aluminum can solve other problems. Low material costs (three times as many pieces from each pound), excellent machinability, ease of finishing and high resistance to corrosion will make Alcoa Aluminum Screw Machine Stock your choice for non-

rusting parts. If you need high heat or electrical conductivity, aluminum has these, too,

These facts practically dictate a hard look at aluminum for the majority of your screw machine parts. To help you take that look, qualified screw machine experts are available at your local Alcoa sales office listed under "Aluminum" in your classified phone book. Aluminum Company of America, 870-H Alcoa Bldg., Pittsburgh 19, Pa.





THE IRON AGE



Mr. J. S. Decker, Mr. E. J. Kwantz and Mr. J. S. Kemp (left to right) discuss purchase of materials for Dictaphone's new Time-Master.



Mr. T. Chanoux (standing) talks over the design of a Time-Master part with Mr. W. G. Deschenaux.



On-the-job production conference between Mr. S. J. Redmond and Mr. J. A. Gunger.

IN PURCHASING

Mr. E. J. Kwantz, Buyer, says, "One reason we do business with Alcoa is because they study our problems and make helpful suggestions. In cases of extremely tough delivery requirements, Alcoa expedites quickly from their mills and warehouses. Availability and quality are big advantages in buying from Alcoa. We find scrap disposal easier with aluminum than with steel."

IN DESIGN

Mr. Theodore Chanoux, Chief Production Engineer, says, "Five years ago we would have been astounded at what we are doing with aluminum today. In addition to weight savings, aluminum screw machine stock helps us solve other design problems. Acme threads were impossible in stainless parts; they're simple with aluminum. Where we have to specify plating or other special finishes for ferrous parts, simple anodizing of aluminum saves us money. Some of our machined parts are bearing surfaces. Here, too, aluminum performs well."

IN PRODUCTION

Mr. Matthew Luciani, General Foreman, says, "We can chase an Acme thread on aluminum with two passes compared to six or seven with stainless steel. Tool and wheel life is longer. Lubricants used with aluminum don't get rancid and smelly. Our operators like this, and they like the fact that aluminum chips don't cut them. We make about 80 aluminum parts for the Time-Master at tremendous production savings. We run machines at top speeds and feeds. The parts don't rust in storage."



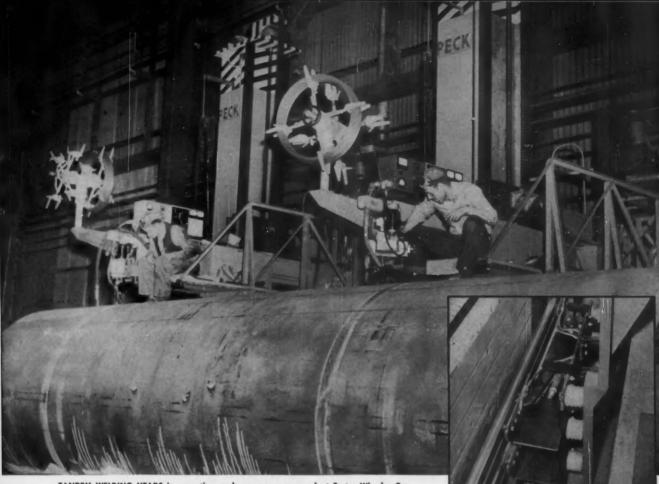




Service Representatives and Stock Points in Principal Cities of U.S.A. and Canada, Brazil, England, France, Sweden, and Germany

ENTHONE

442 ELM STREET, NEW HAVEN 11, CONNECTICUT Metal Finishing Processes • Electroplating Chemicals



TANDEM WELDING HEADS in operation on heavy pressure vessel at Foster Wheeler Corporation.



Clears the Deck for Action

Integrated Aluminum Conductor System Powers Automatic Welders Safely, Efficiently

FOSTER WHEELER'S streamlined welding equipment gets much of its efficiency from the KEYSTONE Aluminum Conductor System that powers it. Hazardous cables are eliminated; this promotes safety and prevents interference which might cause hesitation or vibration—and thus an imperfect weld on the pressure vessel.

Welding generators may be completely mobile (as in this case) or stationary. Full welding current can be conducted where needed; conductor lengths have been installed up to 360 ft., can be longer. There's no limit as to length of rails or amperage handled with KEYSTONE **Aluminum Conductor Systems.**

IMPORTANT NOTE: This application is only one of many in all types of industries. It may suggest a power distribution method in your plant. Write for "Case Histories" on Keystone Aluminum Conductor Systems."



KEYSTONE ELECTRIC SERVICE MANUFACTURING CO.

Philadelphia 32, Pennsylvania

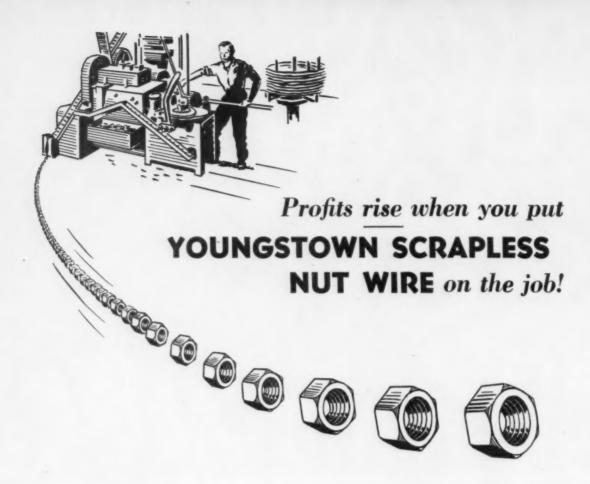
VERTICALLY STACKED conductor rails with collectors running at right angles. This system operates at 675 amps. 440 volts.



RECESSED POWER source with safety plates removed to show side mounted aluminum conductors and collectors.



ROTATING CRADLE and moving welder permits harizontal and circular welding. Behind cradle is KEY-STONE Aluminum Conductor System.



"Production up — rejects down which increased our over-all profit." We hear this story over and over from leading cold heading operators who specify and rely on Youngstown Scrapless Nut Quality Wire. It comes to your shop free from all piping, injurious seams, laps, die marks, internal tearing and cupping, and non-metallic inclusions —all of which defects skyrocket your reject rate.

Remember, because Youngstown controls all its processes, from ore mining to bundling

of the finished wire, it's your guarantee for a continuous production of high quality, brightly polished nuts. Its smooth, strong coating prolongs die life thus minimizing costly die replacements.

Youngstown Scrapless Nut Quality Wire is immediately available in standard AISI as well as special resulphurized steels. Also, Cold Heading Bolt Wire, of the same high Youngstown quality, is supplied in all standard carbon analyses. Phone or write today to our nearest District Sales Office for any additional help or information.

Zourgstour



SCRAPLESS NUT QUALITY WIRE

THE YOUNGSTOWN SHEET AND TUBE COMPANY

arbon, Alloy and Yoloy Steel

General Offices Youngstown, Ohio District Sales Offices in Principal Cities.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT-MECHANICAL TUBING - COLD FINISHED BARS - NOT ROLLED BARS - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - BLACK PLATE - RAILROAD TRACK SPIRES - MINE ROOF BOLTS



through SHELL MOLDING with G-E Shell Molding Resins

This stainless steel instrument housing, cast for a customer by Cooper Alloy Corporation, Hillside, N. J., was one of those "impossible" jobs. Previous experience by the customer had resulted in shrink defects in the lugs on the open face, rendering the castings unacceptable. The job was further complicated by the fact that dimensions and finish were equally critical on both exterior and interior surfaces.

Through shell molding and advanced foundry techniques, Cooper Alloy was able to convert this "impossible" job to a standard production run! Hollow shell cores achieved the required accuracy and finish for the casting's interior; the Shellcast* process accomplished similar results for the exterior. G-E shell molding resins helped Cooper Alloy obtain close dimensional accuracy, fine finish and uniform soundness.

How can shell molding help YOU?

Cooper Alloy uses General Electric shell molding resins in its Shellcast process, relying on them for batch-to-batch uniformity and correctly balanced properties. Other G-E products for shell molding include: G-E silicone release agents to release molds easily from patterns and G-E phenolic bonding resin to assemble shell halves together.

Progress Is Our Most Important Product

GENERAL (ELECTRIC

Ask G. E. about shell molding!

General Electric maintains a shell molding laboratory in Pittsfield, Mass., to help users and prospective users of shell molding solve problems and evaluate the process. G.E. also offers a 28-page manual describing the techniques and benefits of this new foundry method. Just mail the coupon for a free copy!

*Reg. trademark, Cooper Alley Corporation

FREE SHELL MOLDING MANUAL!

General Electric Company
Section (FID)
Chemical and Metallurgical Division
Pittsfield, Massachusetts



Please send me a free copy of G-E Shell Molding Manual.

() We are presently using the shell molding process.

() We are interested in the shell molding process.

Firm

Street _____

City_____Zone___State_

Can a Towmotor Solve My Handling Problems?



Read how a Steel Fabricator increased storage capacity 75%.

Ask for Job Study #145

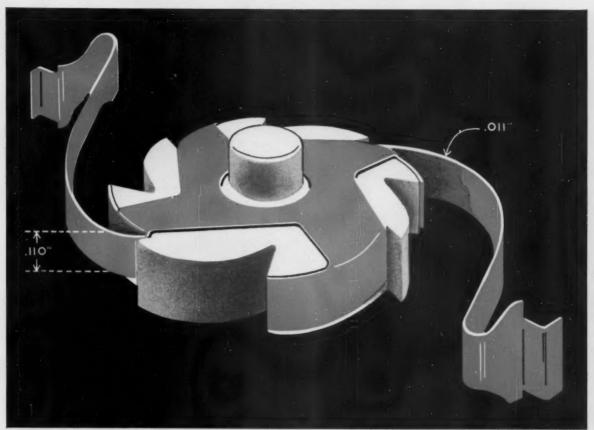
TOWMOTOR

Towmotor Fork Lift Trucks and Towmotor Job-Planned Accessories are "tailor-made" for your particular application in many ways. Soundly engineered by materials handling specialists, the Towmotor line includes 15 different models and more than 60 interchangeable attachments, for every handling need.

Ask your nearest Towmotor Representative to show you what Towmotor equipment can do to speed your materials handling, cut man-hour costs and make maximum use of storage space! . . or write for Certified Job Studies covering your industry. Towmotor Corporation, Div. 1508, 1226 E. 152nd St., Cleveland 10, Ohio.

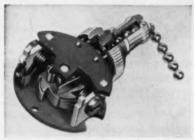
America's best-engineered fork lift truck

THERE'S ONLY ONE FORK LIFT TRUCK CALLED TOWMOTOR



Enlargement showing the contact springs at the "heart" of one model of the Levolier® switch mechanism. Levolier switches are used in industrial and commercial lighting, in heavy-duty industrial sockets, in appliances, fixtures, etc.

The Anaconda alloy tailored for this punishing service actually costs less



Cutaway of Levolier Switch No. 41 shown approximately actual size.

THE PROBLEM: The McGill Manufacturing Company, Inc., Valparaiso, Indiana, was interested in a desirable substitute for a premium copper alloy used in contact springs for their widely known Levolier switch mechanisms. Unexcelled quality had to be maintained with a new alloy that would help hold prices against rising costs. As these switches are designed for long service and heavy-duty

industrial service, the spring material has to be tough and durable.

THE SOLUTION: In 1952, McGill discussed the problem of an alternate spring material with a metallurgical engineer from The American Brass Company. After an analysis of the requirements, a special Anaconda alloy was offered – Ambronze-422, rolled to spring temper.

Samples were prepared and tested by McGill and Underwriters' Laboratories. The material performed satisfactorily in standard tests—current carrying capacity, 6 amps at 125 volts d.c.—readily exceeded the requirements of 75,000 cycles, or 150,000 individual operations.

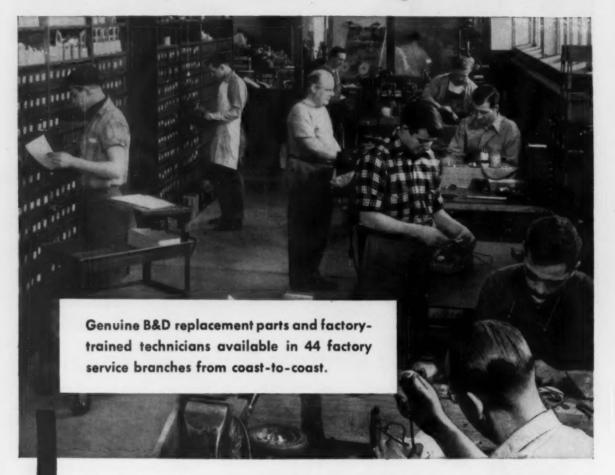
In production, the new Anaconda alloy also performed satisfactorily. It was necessary to make only one minor dieforming change. McGill received a desirable saving in material costs – product quality remained high—and the material was available as needed to maintain production.

FREE TECHNICAL SERVICE: This is another example of the Anaconda technical service available to metal users. Sometimes a new alloy is required—other times a variation of a standard alloy will do the job. The Technical Department of The American Brass Company, through its day-to-day work with a wide variety of metal problems, offers a tremendous breadth of experience, which is at your disposal. See your American Brass Company representative or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

ANACONDA

COPPER ALLOYS

Black & Decker next door factory branches provide fast, expert service!



Black & Decker's responsibility to you and to the B&D Electric Tool you buy never ends with your purchase. (Even the finest tool may eventually require reconditioning after long periods of use.) That's why Black & Decker owns and operates 44 factory service branches . . . geared to provide swift, skillful servicing of your electric tools by factory-trained technicians using only genuine Black & Decker replacement parts.

Each branch is an integral part of the world's largest facilities devoted exclusively to portable electric tools. This assures you of the highest quality in parts and servicing.

Your tools go back to work in short order.., without cost-consuming delay . . . because one of the 44 branches is located "next door" to you wherever you are. The Black & Decker Mfg. Co., Dept. 7808, Towson 4, Maryland.

Look in the Yellow Pages under "Tools-Electric" for Nearest B&D Service Branch





BLAW-KNOX makes what it takes

for continuous, mechanical chipping

The Continental Chipper with auxiliary equipment is a complete mechanical system for sorting, handling, inspecting and chipping billets. This integrated system has demonstrated in-service cost savings over manual conditioning. It represents a wise investment in long range modernization programs for conditioning for subsequent rolling in merchant and bar mill operations.

Product quality improvement is immediate, positive. Precise chipping is accomplished by a non-traveling cutter head under which the billet moves in a fashion similar to a milling machine. All chipping is done at close range, immediately in front of the operator. This single operator, located in front of the cutter head controls the entire operation including all material handling.

The chipper is equipped with special interlocking devices which eliminate unsafe operation. Usual chipping bay hazards such as high pressure air lines, improperly handled chisels, and flying chips are removed. The Continental Chipper accommodates billets up to 30 feet in all merchant and bar mill sizes.

For complete details, write for illustrated booklet.

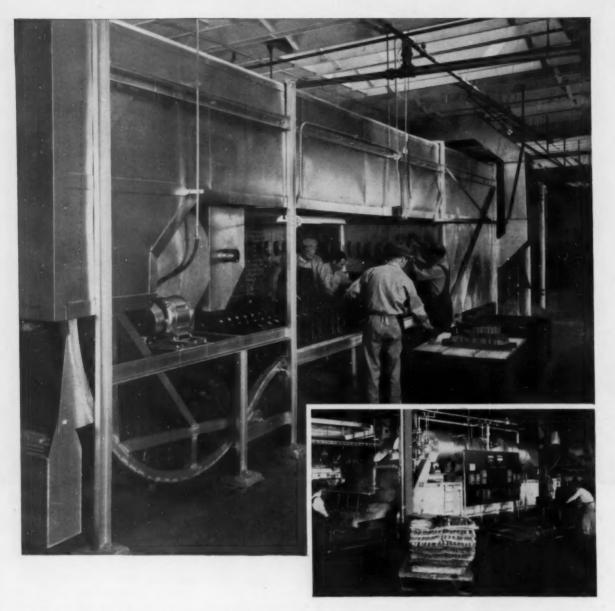


BLAW-KNOX COMPANY

Foundry and Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania







"Production time slashed from minutes to seconds . . .

thanks to GAS"

In this Gas-fired bonding oven at Laher Spring and Tire Corporation, Oakland, California, brake linings are molded to brake shoes under pressure. With their modern Gas-fired equipment, Laher turns out six times as many brake sets as they did with their old equipment—with pronounced savings!

To develop this two-line inverted furnace, Laher worked closely with Heat and Controls, Inc. and the local Gas company. The result was an efficient, compact oven and production line that cut production time from minutes to seconds. What's more, the adhesion is many times stronger, giving a better product.

The advantage of Gas is already apparent at Laher. For information on how Gas can help you in your production operations, call your Gas Company's industrial specialist. He'll be glad to discuss the economies and results you get with Gas and modern Gas-fired industrial equipment. American Gas Association.

Now...load rate your bearings at higher values

1-ROL CROWNED ROLLERS

Greater capacity . . . longer life . . . or a precisely balanced gain of both factors. That is the choice offered you by the "crowned" rollers of Tru-Rol bearings.

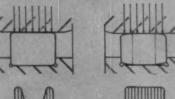
By finish grinding a carefully selected crown radius on roller ends, Rollway relieves high stress areas, insures uniform distribution of load over the entire length of the roller. Rollers can take heavier loads without excessive end-fatigue, and are less subject to the effect of slight misalignment or deflection.

The result is load rating at higher values for greater capacity, longer service life . . . or both. If this choice interests you, why not write for the complete story. Rollway Bearing Co., Inc., Syracuse, N. Y.

Tru-Rol Bearings with crowned rollers are available in 3 types



Comparative Stress Patterns under Uniform Loads for Straight and **Crowned Cylindrical Rollers**



Stress pattern for a straight cylindrical roller under load. Note uneven end-loading.



ing radius is exaggerated

 Rollway engineering service is available to help you select exactly the right bearings for your needs. Write us.

Retainer



with Guide Lips



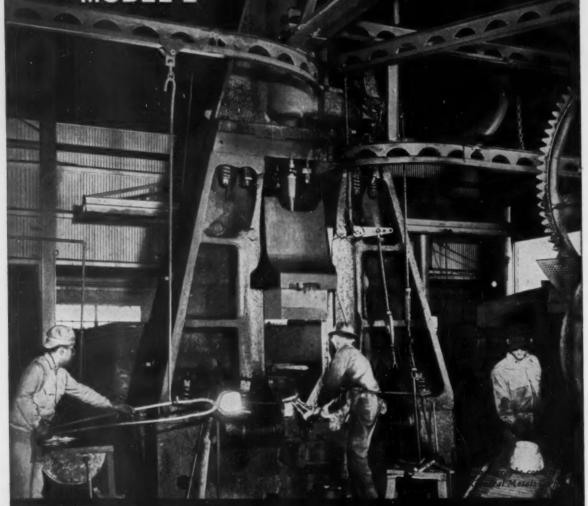
ROLLWAY BEARINGS

ROLLWAY REPLACEMENT BEARINGS are available through authorized distributors in principal cities. Consult the yellow pages of your telephone directory under "Bearings".

ENGINEERING OFFICES: Syracuse · Boston · Chicago · Detroit · Toronto · Pittsburgh · Cleveland · Milwaukee · Seattle · Houston · Philadelphia · Los Angeles · Sen Francisco

CHAMBERSBURG STEAM DROP HAMMERS

MODEL E



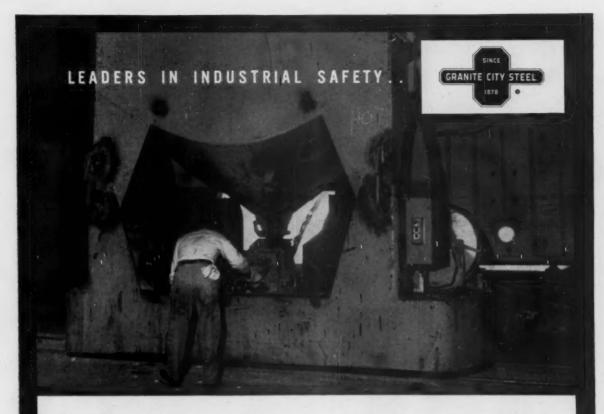
MODERN FORGING REQUIREMENTS DEMAND MODERN HAMMERS

Shown above is a 6000 lb. Model "E" Chambersburg Steam Drop Hammer forging 4" alloy steel valve bodies. A Chambersburg 200 ton Steel Side Trimming Press is used to complete the operation. The Chambersburg Model "E" Hammer pays its way through increased production and trouble-free service. Details of this modern hammer are in our Bulletin No. 55-L-4. If interested, write for a copy.



Trimming Forgings on Chambersburg Trimmer

CHAMBERSBURG ENGINEERING COMPANY CHAMBERSBURG, PA.



City Steel Co. helps prevent slag from burning through furnace bottoms and walls.

GIANT DOLOMITE SLINGER at Granite It could be a dangerous source of plant lic fluid—a good example of the progresfires! GCS prevents fires by powering the machine with fire-resistant Pydraul hydrau-

sive safety program at the "Steel Center of Mid-America," Granite City Steel Company.

Pydraul Protects Hydraulic Operation at Granite City Steel

At Granite City Steel, Pydraul is the ideal hydraulic fluid for use in the hydraulically operated dolomite slinger shown above. Although this slinger is used at the mouth of open hearth furnaces, there is little danger of hydraulic fire because Pydraul is fire-resistant.

Pydraul's claim to safety and dependability has been proved not only at Granite City but by 275 million hours of fire-safe operation in plants everywhere.

Pydraul gives you more than safety. You can be sure of long equipment life with low maintenance ... because Pydraul lubricates like a premium petroleum oil. You'll save money on fluid make-up, too! Pydraul is reclaimable-you can return spillage to the system, use it again and

If your hydraulic equipment is near hot metal, electrical contacts, open flame or other heat sources, you may be taking a needless fire risk.

Your Monsanto representative will be happy to show you how easy and economical it is to convert to a fire-safe Pydraul system.

Write for Pydraul F-9 booklet. Organic Chemicals Division, MONSANTO CHEMICAL COM-PANY, Dept. PYD-3, St. Louis 1, Missouri.

Pydraul: Reg. U.S. Pat. Off.

Pydraul F-9-first and only hydraulic fluid listed by Underwriters' Laboratories, "In respect to fire hazard, Pydraul F-9 is rated by Underwriters' Laboratories, Inc., 2 to 3 in a class much less flammable than paraffin (Petroleum) oil, according to a schedule in which Ether is rated 100; Gasoline 90-100; Alcohol (ethyl) 60-70; Kerosene 30-40; Paraffin Oil, 10-20.





Works Wonders For You



Smashing scrap since 1953...this 48" diameter, 16,770-lb. Ni-Hard drop ball is still going strong. Pays maximum return per dollar invested. High hardness helps lengthen its life.

In addition, it is tougher than this hardness indicates. That's why it withstands the shock of jolts against scrap. Produced by United Engineering & Foundry Co., Pittsburgh, Pa.

Ni-Hard ball outlasts others by 3 to 1 ...breaks 27,000 tons of scrap and still on job

A Ni-Hard* drop ball earns you money because its resistance to abrasion greatly increases its life. Look at this one, for example... on an open hearth scrap drop at United States Steel Corporation's Youngstown District Works.

The ball looks battered, with one side slightly flattened out . . . but it should be after the service it has already given:

This Ni-Hard ball has broken up some 25 tons of scrap a day, seven days a week for more than three years.

Balls made of other materials averaged only 13½ months in the same service. Yet after 40 months the Ni-Hard ball is still in use. As a result of its unmatched resistance to abrasion, it still retains its working weight.

You'll profit by using a ball that stays hefty longer as it breaks up your scrap. So specify your next drop ball in Ni-Hard nickel-chromium white iron. A list of authorized producers is yours for the asking. Write for it now.

Registered Transformer



Ni-Hard drop balls come in various sizes, and applications include fragmentation in reclaiming steel scrap from slag, breaking up cast iron scrap, powdering rock and the like. These drop balls were cast by United Engineering & Foundry Company.





Rely on your AIM*... Wheeling Steel did... Sheet steel packaging bottleneck eliminated

Acme Idea Man, R. F. Henkel helped Wheeling Steel build packaging output 300%.



WHEELING STEEL sought an idea for speeding up steel strapping of 7-10 thousand pound lifts of galvanized "Softite" sheet steel. Manual strapping output was low because of inconvenient methods of steel strapping lifts on floor and tables. Working with their Acme Idea Man, Wheeling Steel Corporation, Wheeling, West Va., developed a centralized conveyor line and steel strapping procedure (Idea No. U6-5).

Now, varying sizes of lifts move from prime piler to transportation without manual handling. Acme Steel hydraulic tools apply heavy duty steel strapping, tension, seal and cut.

The operation is safe, fast, economical and provides stable packages for shipping and storing. Operator fatigue is minimized. Packaging output is up more than 300% per shift.

*Rety on your Acme Idea Man for help with your packaging and shipping problems. He will discuss practical material handling techniques and their application to your operations. Call him at your nearest Acme Steel office, or write: Dept. IFU-86, Acme Steel Products Division, Acme Steel Company, 2840 Archer Avenue, Chicago 8, Illinois. In Canada, Acme Steel Co. of Canada, Ltd., 743 Warden Ave., Toronto 13, Ont.



Handsome, functional MINIMESH ⇒ makes good products better





Minimesh grille protects speaker, transmits sound, adds beauty in new coin-operated phonograph by J. P. Seeburg Corp., Chicago.

Because it combines beauty and utility — at low cost, Penmetal Minimesh is widely used for decorative purposes and for guards or grilles on stoves, heaters, radios, phonographs, etc. Three famous products, which have been improved with Minimesh, are shown.

Minimesh is small mesh (3/16") expanded metal, and like the larger meshes, is sheet metal which has been slit and expanded up to five times its original width. 80% lighter than solid sheet of the same dimensions, the diamond truss pattern adds rigidity and strength.

The openings in Minimesh permit passage of light, heat, air and sound. Comes in standard or flattened form. Can be cut, shaped or welded to suit design requirements.

Put Minimesh to work for you. Write for new catalog 510-EM, which gives sizes, weights and dimensions.

PENN METAL COMPANY, INC.

General Sales Office: 40 Central Street
Boston 9, Mass.
Plant: Parkersburg, W. Va.
District Sales Offices: Boston, New York,
Philadelphia, Pittsburgh, Chicago, Detroit,
St. Louis, Dallas, Little Rock, Seattle,
San Francisco, Los Angeles, Parkersburg



ABOVE — Zenith Radio Corp., Chicago, incorporates extensive Minimesh grillework in this radio set.

RIGHT—Gas heater by Temco, Inc., Nashville, Tenn.—one in a famous line recently redesigned with Minimesh to bring modern styling to the gas heating field. Open mesh grilles deliver heat.





PM-100



Honing for Perfection of Ross Hydropower Linkage

Ross Gear & Tool Company of Lafayette, Indiana, has long been noted for its Hydropower linkage-type power steering control. Used in the toughest kind of service, on vehicles produced by International Harvester, J. I. Case, John Deere, Towmotor, Mack, Diamond T—and other equally notable manufacturers—Ross equipment has well earned its reputation in its field.

At the heart of this rugged hydropower unit is a length of B&W Electric-Resistance-Welded Mechanical Tubing. Machined to close tolerances, honed to micro-inch smoothness, then threaded, it forms the basic component to which other vital parts are fitted, internally and externally. It is the strategic member of the assembly.

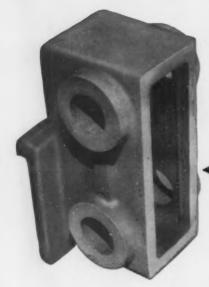
When you have need for tubing of uniformly high

character . . . tubing on which you can depend every day, send for Mr. Tubes, your nearby B&W Tube Representative. Or write for Bulletin 362. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.



Seamless and welded tubular products, seamless welding fittings and flanges—in carbon, alloy and stainless steels

August 16, 1956



GRAY IRON CASTING

machining \$9.22 TOTAL COST \$21.72

WELDMENT

initial cost \$21.00 machining \$23.50 TOTAL COST \$44.50

GRAY IRON SAVES OVER 50%

The cost of this Chain Box was cut more than half by switching to one, uniform-strength Gray Iron casting. And there are no more welded seams of varying quality to worry about! An important fact, since this chain box is used on rugged road-building equipment. Pattern costs were quickly amortized.

It will pay you to look for new, cost-saving ways to use Gray Iron... and at the same time obtain the other unique advantages inherent in modern Gray Iron castings. Gray Iron is durable...rigid...absorbs vibration...is heat and corrosion resistant...has low notch sensitivity and a wide strength range. It is truly the proved metal that meets modern design needs better and more economically.

For specific technical and business information, write direct to Gray Iron Founders' Society, Inc., National City—East 6th Building, Cleveland 14, Ohio.



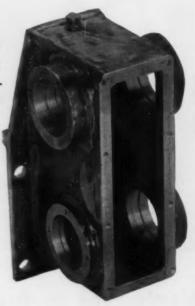


Here's why it pays to call in one of the more than 500 leading foundries displaying the Society symbol:

- The most recent technical and business information is available to each member through the Society to help you design better products at lower cost.
- The use of sound cost accounting procedures is recommended and encouraged among Society member foundries, assuring full value for your casting dollar.
- Improved castings result from the advanced techniques and the high sense of responsibility of Society members.

MAKE IT BETTER WITH GRAY IRON

GRAY IRON FOUNDERS' SOCIETY



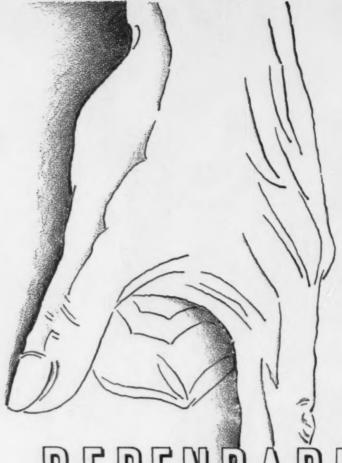
How Jessop skill makes better saw steel

If you could peer down into the Jessop mill, chances are you'd see groups of men hand-rolling sheets of steel with a degree of skill and careful concentration that might seem excessive at first glance. Yet it isn't. These men are producing a very special steel-top quality high-speed sheet which is used in the making of hack-saw blades, woodworking tools, metal-slitting saws, general industrial knives, and the like. But skillful finish rolling isn't all. Jessop rigidly controls its melting formulas and pours small ingots specially designed for cross rolling. This insures a fine uniform grain structure so that the stock blanks well, forms well, swages well and has superior edge holding qualities. Remember, when you order your saw steel from Jessop, you are buying the finest that Jessop experience can offer. And that's mighty fine steel.

STEEL COMPANY - WASHINGTON, PENNSYLVANIA

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"What's wrong? They're both 8620 alloy steel!"

A Baltimore manufacturer was working on an order for oil pump gears of 8620 alloy steel. The first lot of steel attained satisfactory core hardness—but the second lot would not meet minimum hardness requirements.

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The manufacturer ran into trouble because the chemical composition and hardenability of different furnace heats of the same alloy can and do vary (within AISI and SAE limits) enough to have a marked effect on heat treatment response. As a result of such variation, the "right" alloy failed.

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varying properties and hardenability is always yours when you specify and buy Ryerson certified alloys. That's because we test your particular lot of steel for heat treatment response, verify its chemical composition—and give you a record of these tests, keyed to the identification symbol on the steel.

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THE IRON AGE

NEWSFRONT

Guesstimators Jump Pricing Gun

"Anticipation" price increases by companies using steel may put extra ateam behind the inflation spiral. One maker of farm implements says it put through an earlier increase when steel extras wiped out its profit margin. This year the company will figure on a similar rise in extras when setting its new price schedules.

Dissolution Problem Licked?

What's the toughest problem in fabricating liquid-metal-fueled reactors? Certainly one of the toughest has been dissolution of certain constituents of the steels used for tubing in the circulating uranium-bismuth bath. This plugs the tubing. Researchers think they may be close to licking it. Dissolving zirconium in the liquid fuel appears to form a corrosion-protective coating. If this works out, various reactor parts could be of steel for economy.

New High Temperature Paint

Developed by the Army Corps of Engineers, a new paint is said to stand up remarkably well under high-heat punishment. It's capable of withstanding temperatures to 1400°F without significant deterioration or loss of its protective abilities. Aim was to produce a paint to protect heated steel parts, such as mufflers and manifolds, from accelerated oxidation.

Aluminum: Citrus Market Inroads

A leading Florida producer of citrus fruit concentrates is reported ready to market his product in aluminum containers next year. Details of the container aren't reported nor relative cost. But it's been learned reliably that the new packages are definitely past experimental stages.

Vacuum Metallizing: On The Upswing

Vacuum metallizing is picking up steam. Formerly written off by many as simply a means to a brilliant decorative finish, it's now standing up on its engineering merits. Applications include printed circuits, aluminized television tubes, glass metal joints, complexly-contoured surfaces formerly electroplated. Cost per unit continues its downward trend.

Free-Piston Engine Progress

Watch the newly-developed GM free piston engine. Predictions are it will be a major contender in the commercial power field. Company's Cleveland engine division is supplying Maritime Administration with 6 free piston gasifiers, for installation on a converted liberty ship slated for trans-Atlantic service.

Federals Step Up Anti-Smog Fight

Look for a stepping up of federal control over pollution and related research activities this next 12 months. Boosted Public Health Service appropriations will mean larger contributions to local anti-smog programs—perhaps up one-third. Other uses, besides such local shots-in-the-arm: increased smog research expenditures by federal government agencies; boosts in training of anti-smog scientists.

Reusable Corrugated Container

Packaging engineers at one large plant cut costs on one type of corrugated container 33 pct. A relatively simple redesign turned the trick. Before, the file-drawer-sized container was held together with gummed tape. Now four small, flat metal clips close it. Clips remove in a few seconds time, and the box is then simply unfolded and spread flat for storage.

Cuts Blast-Cleaning Maintenance

Sharp edges on grit particles can cause excessive wear on a blast cleaning machine. One equipment maker suggests using steel grit in blast cleaning of heat-treated parts to reduce equipment maintenance and abrasive consumption. Since particles won't chip away on striking surfaces, sharp edges are eliminated, wear-and-tear on the machines is reduced.



In estimating production costs, one of the items a metal fabricator takes into account is the cost of steel. As important as this is, it is sometimes good economics to pay more for steel, but pay less in the end for the fabricated part. The cost of down time on expensive forming equipment, the cost of idle labor, the cost of reprocessing defective parts, may well exceed the cost of the extras built into restricted specification steel, which will eliminate these unplanned-for costs.

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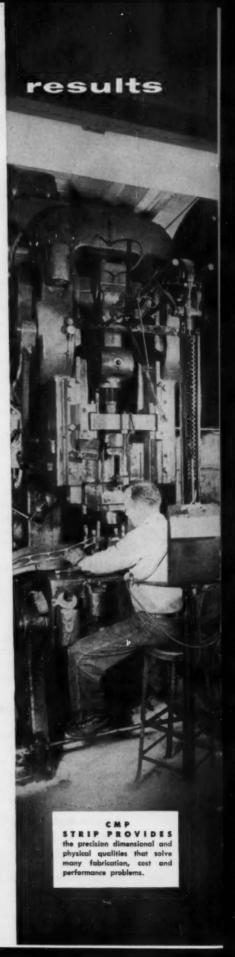
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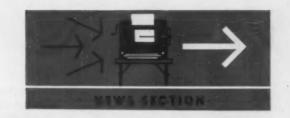
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DIVERSIFICATION: Watch The Pitfalls

Product diversification can be rewarding . . . But careful planning and soul-searching are important prerequisites . . . How to do it and what to avoid . . . Three ways to diversify outlined—By R. W. Dalzell.

◆ THE ROAD to product diversification can be rocky or smooth. But it's seldom easy.

And the pot at the end of the rainbow can hold ashes as well as gold. On the record, there have been more failures than successes in this business of introducing new products.

Success or failure can hinge on how many soul-searching questions the diversification bound company asks itself—and how many honest answers it comes up with.

No Cure-all

The company that plunges in without a close look at all angles is like the fellow who tries to break the bank at Monte Carlo. The results are more likely to be disastrous than rewarding.

First thing to ask yourself is whether diversification is the only answer to your problem. It could be that the time, effort, and money would be better spent shoring up weaknesses in your present business area. Remember that diversification is no cure for management shortcomings. It's more likely to aggravate the disease by generating new management challenges.

And don't be ashamed to back away if the proposition is not so rosy after close inspection as it looked at first glance. Too many times, managements have decided to enter a new business to justify the time and money spent on a program. Usually, these ventures lead to unhappy consequences.

Here are two basic areas you should look into before a new product is taken into the family: 1. What are the general objectives of your business as a whole? Do management and stockholders want to continue it on a long-term basis? Is capital buildup or current return more important to the owners? Are the stockholders in a mood to take on more of a risk than that involved in the existing business? Are there any operating characteristics of the business, such as seasonality, which should be remedied for the long-range good of the business?

These fundamental, long-term objectives should be clearly defined by management, of course, for general business planning. But it's particularly important that they be agreed upon before considering a new business venture.

2. Make sure you're doing as well as you should in your present business before shouldering new problems.

How To Do It

If answers to the foregoing questions don't rule out diversification, here's how to go about it:

The first step is to take stock of your corporate strengths—and weaknesses. These resources may be human or physical and include such factors as acceptance in specific markets, established distribution channels, design and engineering skills, plant facilities, natural resources, highly skilled management in a given business area, and many others.

In our experience, we have

Richard W. Dalsell .

Mr. Dalsell is an old hand at solving management problems, especially in the financial and marketing fields.

During eight years with Lukens Steel Co., he directed market research and development, dealing with a broad variety of fabricated steel products.

Since mid-1954, Mr. Delsell has been a member of the Business Research group at Arthur D. Little, Inc., Cambridge, Mass. His specialties are diversification, feasibility studies, evaluation of risk capital investments and investment policy, and marketing and distribution research.



found that management, technical skills, distribution channels, and market acceptance are generally the most important resources.

Production facilities and knowhow, particularly in the metalworking industry—are a resource. But diversification based on production resources alone is usually risky because of the highly competitive situation in most areas of metal fabricating.

Strength Versus Weakness

Production-oriented companies, particularly those whose operations have been concentrated in contract manufacturing, many times prefer to diversify by buying a going business. In this way they obtain ready-made sales organizations, market acceptance, product design skills, and the like.

It is just as important to assess weaknesses as it is to recognize strengths. Frank recognition of deficient areas, such as lack of merchandising or product engineering skills, need not lead to a negative decision regarding diversification. However, it can lead to a program geared to overcome them.

In adding up strengths and weaknesses the management group might well consider one more factor: It should determine whether there is any type of business even remotely related to the current one which it finds interesting and stimulating. This human interest factor has been a prime contributor to success in several company diversification programs. Of course, no matter how much enthusiasm is generated by this approach, the new venture should still make business sense.

Product Guideposts

After you've found out where your strengths and weaknesses lie, your second step is to formulate a set of rules for a new product or line. Such yardsticks are invaluable both in directing product search and in evaluating opportunities. From a practical stand-

point, you can't expect to find a product that will satisfy all your requirements. So it helps to separate the requirements in at least two groups, say, major and desirable. Products under consideration can then be judged on the basis of these yardsticks.

Once you've set up the yardsticks, the third step is to find a line or product to fit them. The new line or product can originate from one of three general sources; (1) internal development, (2) product acquisition or (3) taking over a going business. But regardless of where they originate, new product areas should be screened and the possible range narrowed by exploratory research and evaluation with respect to product requirements. This process then should be carried on to a finer degree, identifying, exploring, and evaluating specific product lines within a chosen area.

It's possible that after a close look, changes in certain standards, or the addition of others, will be justified. It is not too important that the original product rules first be strictly followed. But it is important to have and to use a set of standards which will provide objective guides for each major decision to be made. It's easy to become too enthusiastic over a product or company on its own merits and to overlook the fundamentals of diversification.

Narrowing Field

There are a number of tools available for use in product

Three Ways To Acquire A Product

duct and of the business organization needed to promote it is generally a high risk situation - unless it is related closely to existing management, design, engineering, and marketing skills and facilities. Employment of one or several key persons with extensive experience in the proposed new field makes the job easier.

Product Acquisition: Acquiring a license or other rights on a product available for manufacture and sale. This can some times provide a short-cut, particularly from a product design standpoint. However, in most instances it still requires substantial engineering, tooling, and market development investment.

3. Taking Over a Going Business: If the company is adequately evaluated and is operating at a reasonable profit in relation to contemplated investment, this course probably involves the least risk of any diversification method.

search. Probably the broadest is the Standard Industrial Classification Manual, published by the Executive Office of the President. Bureau of the Budget, and obtainable from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at a cost of \$1.25. This is a complete list of major classifications and types of manufactured products that are produced and marketed in the United States. It may well suggest fields which ordinarily would not come to attention

For more directed search, directories and encyclopedias for many specific industries are available which furnish specific details on products and companies in, or serving, these fields. Trade magazines also provide information on new products and businesses, some of which are frequently available to a company with financial and other resources.

Once product search has been narrowed to a fairly specific product or market situation, discussions with distributors or even major users regarding their experience and needs are generally profitable.

Of particular interest to metalworking firms, a number of the basic metals producers, both ferrous and nonferrous, make available to potential customers the services of their market development departments.

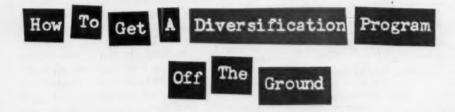
Diversification Pitfalls

There have been more failures than successes in introducing new products. The major reasons for failures are:

- 1. Inadequate knowledge of markets and buying habits.
- 2. Inability to finance an adequate development program, particularly for market development. Market development costs often exceed those of development engi-

neering, and facility additions or modifications.

- 3. Lack of appreciation of the market acceptance and general resources of competition particularly where one or two companies control a given market. It is generally more difficult to enter a market dominated by relatively few companies.
- 4. Nonprofessional approach in management, design, and marketing. Many times, a highly qualified management and organization in its own field has failed in a new business area, simply because of lack of experience and/or adaptability in another type of business. For example, it is difficult for a firm in a field of highly engineered industrial products to utilize the same management philosophy, engineering skills, marketing approach, or manufacturing facility to serve even its current markets with a low-cost, volume-produced product.



Corporate Objectives—

What the Company Wants To Do

- 1. Maintain current operations at \$10 to \$12 million annual level, manufacturing heavy appliance components and plated novelty items for automobile supply jobber distribution.
- 2. Broaden the company's product line to reduce its present dependence on five contract customers for 50 pct of sales, and on automotive novelty items, which depend on fad acceptance, for 30 pct of total sales.
- 3. Develop or acquire a proprietary product line to enable the

Success or failure of a new product depends to a great extent on the amount of planning which precedes it. Before a specific product is even considered the company should first outline its corporate objectives, analyze its strengths and weaknesses and set up yardsticks for judging proposed new products.

Here is a step-by-step example of how a typical metalworking firm might go about it--pointing out the type of information needed to make a sound evaluation of a new business situation:

company to control its own markets and to reduce its dependence on contract manufacturing and private brand customers.

- 4. Invest surplus working capital, amounting to approximately \$1.5 million, in business expansion to realize a minimum on investment of 20 pct before taxes.
- 5. Maintain an annual dividend rate of at least \$5 per share to provide adequate income to beneficiaries of family trusts controlling 35 pct of outstanding stock.
- 6. Look forward to creating a public market for the company's

Continued

SPECIAL REPORT

stock to provide the family trusts as well as present equity management or its heirs with a greater degree of investment liquidity.

7. Retain equity management and family trust ownership of at least 51 pct of outstanding common stock. Since these interests now own 60,000 shares, or 80 pct of the 75,000 shares issued and outstanding, this would permit issuance of approximately 40,000 additional shares valued at \$80 per share, or \$3.2 million on a current book basis. This newly issued stock could be applied toward financing a sound diversification opportunity.

8. Provide over the long term a

s o u n d income-producing investment for family interests.

 Assure present junior management members an opportunity for creating a satisfactory career in the business.

Once it has been decided that a diversification program will not conflict with long-range objectives, the company then must determine if it can successfully undertake a new line or product. This calls for a frank appraisal of company strengths and weaknesses.

Strong Points:

1. An aggressive and seasoned senior management team consisting of the president, vice president in charge of sales, treasurer, and vice president in charge of operations. All are between 50 and 55 years of age and are vitally inter-

ested in continuing their full-time management responsibilities.

2. Extensive metal forming and finishing skills and facilities including extrusion, die-casting, stamping, mechanical surface treatment, chrome plating, anodizing, enameling, and associated operations for the fabrication and finishing of ornamental metal products.

3. Excellent production management throughout the plant, including tool design, production scheduling and inventory controls, quality control, and cost accounting. The company is believed to have the lowest shop costs and rejection rate in the sharply competitive industry in which it operates.

4. High quality labor force, of approximately 500 people, which could be increased by 50 pct through drawing from the local area. Employee-management relations have been excellent, with no strikes or slowdowns over the last ten years.

 A high degree of acceptance as a source by major appliance manufacturers and by the automotive jobbing trade.

6. Through close association with the design groups of appliance manufacturers, a sense of styling of ornamental trim and hardware.

7. A centrally located, expandable plant location in a relatively favorable labor area (average plant wage \$1.65 plus 12 fringe benefits) with approximately 35 pct of U. S. and industrial consumer markets within a 500-mile radius.

8. Some consumer acceptance as a producer of high quality automotive novelties, particularly in the male, 16-25-year-age group.

Weak Points:

1. Lack of an organized technical research activity. A metallurgist and a chemist, both of whom were employed approximately three years ago to develop new processes and products, have been totally absorbed with trouble-shooting problems in the plant.

Senior management pre-occupation with day-to-day duties. It is believed that much of this work

Organizing A Development Program

If you've decided to develop a new product internally, a development program, timetable, and budget should be set up before any major steps are taken. Here's what it should include.

1. Define the product in terms of function, price, services, and other matters of interest to the distributor and user.

2. Determine by market research: (a) distributive and consumer acceptance (b) market potential (c) requirement for, and availability of distribution channels (d) pricing, discount, and financing practices (e) competitive activity (f) long-term market trends (g) design and engineering features to maximize acceptance.

3. Complete design and produce prototype models.

. Make final market tests.

5. Complete production engineering and prepare facilities.

6. Set up market development and distribution program:

(a) sales organization (b) advertising and sales promotion (c) other

sales support, e. g. technical service.

7. Project investment, earnings, and cash flow over a three to five-year period.

could be delegated to more junior people in the organization over a 1- to 2-year period, thus freeing management for broader assignments.

3. A board of directors that provides management with little stimulation or outside viewpoint. It is comprised of the senior management group and two trustees representing other family interests.

4. A narrow sales organization comprised of a vice president in charge of sales and two sales engineers servicing the appliance accounts, and a sales manager and three field representatives servicing the chains and the automotive jobbing trade.

Knowing where its strong points lie, the company is now ready to form opinions on the type of product best fitted to its present operations. Realizing that no one product is ideal, it breaks product requirements into major and desirable needs.

Major Needs:

1. The new business should involve a proprietary product, or one which can be merchandised to the user as a finished unit bearing the company's own brand.

2. Required investment should range between \$2 and \$4.5 million and produce earnings of at least 20 pct before U. S. income taxes. The minimum limit is based on the company's requirement for a fairly substantial product line in relation to existing business potentials, and the maximum on cash and newly issued stock available for investment.

3. The new product line should have growth potential, both in respect to the total market and the company's participation.

4. The product line should be developed both from a technical and a market standpoint. It should not require a substantial pioneering effort by the company nor should operating losses be anticipated through a development period.

5. Diversification should probably be accomplished through acquisition of a going business with particular emphasis on securing product management, sales organ-

Sizing Up A Going Business

If you're thinking of buying a going business, examine it thoroughly before committing yourself. Here are three important steps.

1.) An accountant should verify assets, liabilities, and earnings records.

2. Legal examination of indentures, corporate charters, stock restrictions, executive compensation contracts, and other pertinent legal documents related to assets, liabilities, and corporate equity rights and obligations.

3. An operational analysis to study those segments of business that will contribute in a major way to future profits. The following situations should be analyzed: management, market potential and trends, product strength, engineering evaluation, user and distributive acceptance, distribution, research and development, patent position, manufacturing, competition.

ization, product design and engineering, and research and development skills.

The product line should provide a basis for future expansion of the business through diversification.

7. The product should be such that "garage-shop" competition would be limited by substantial investment requirements.

8. The product may be either for industrial, commercial, or consumer markets. However, it is desirable that the market be comprised of a substantial number of customers, so that the loss of one or several would not materially affect the total picture.

9. The product line should capitalize on the company's knowledge of mass production of small and medium-sized metal forms, and their decorative finishing.

10. Research and development requirements for the new product line should be such that the same metallurgical, chemical, and mechanical group could provide services for the company's existing business.

11. If a going business is ac-

quired, the manufacturing facility should be within 150 miles of the company's present headquarters.

Desirable Needs:

1. The product line should not be sold on a seasonal basis.

2. The product line should not be subject to short term changes.

 Distribution should be available through the automotive jobbing trade.

4. Manufacturing facilities should be somewhat similar to those in the existing plant to provide for exchange of overflow volume, particularly in respect to appliance components which have seasonal peaks.

5. Ideally, it should be feasible to house new manufacturing facilities in an expansion of the present plant, both to simplify management and staff coordination and to take advantage of local labor conditions.

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FREIGHT CARS: Shortage Is Hurting

Lower plate allocations for car builders will add to production woes... Schedules already thrown out of joint by steel strike... Unusually large fall shipments will cause railroad jam-up—By K. W. Bennett.

◆ THE LOSS of six weeks steel production will probably cut back total freight car production this year by nearly 8000 cars. To shippers who already were hunting for shipping space as the steel strike began, the combination of a cutoff in freight car production coupled with a sharp rise in fall carloadings, spells transportation headaches.

As the strike began, freight carloadings nationally were running about 5 pct ahead of a year ago. The nub of the shortage has been closed box cars, and railroad men expect that steel shortages have affected this type of car.

Jam-up Coming

Loading platforms soon will be heaped extra-high in three major industries:

1) Steel—heavy tonnages coming as production steps up.

Automotive—new car models begin rolling in September.

 Agriculture—an unexpected, huge fall harvest is on its way.

Products from all three move in the same type box car, as do a major portion of items manufactured by the metalworking industry.

The steel supply situation is further complicated by the fact that some mills, expecting more ingot than they actually were able to produce, oversold plate capacity. While carryovers did not run much over four weeks as the strike began, there were instances of carryover of as much as 90 days. This, with the additional impact of the loss of 4-6 weeks production at the mill, should further cut plate and structural availability.

Confided one steel salesman, "Freight car components makers are throwing up their hands. They were really hard up for steel when they came into this thing. With

the cutbacks we'll have to make, they'll be in even worse trouble."

Another factor has been the impossibility of stepping up the car delivery rate, whether the cars are needed or not. In either case, the backlog remains, as of July, at a whopping 116,664 cars compared with 28,300 cars on backlog a year ago at this time.

Shipping Forecast

It will be a tight fall. Not only for carbuilders who need steel, but for shippers who need boxcars.

Prior to the steel strike, the national shipping forecast for third quarter of this year predicted a 4.4 pct increase. Since September and October are traditionally strong agricultural shipping seasons, and since automotive movements should begin in late September and October, the combination will put greater pressure on rail facilities from sources that have thus far this year been shipping material at a comparatively low level.

Carbuilders were turning out box cars through July, the steel strike period, though at a reduced rate. Despite the reductions, there is little or no steel in inventory and it will be necessary to refill the construction lines before deliveries in any volume can begin.

Until the strike, and probably into early July, car deliveries had been moving at a cracking 5531 car per month average, or a total through June of 33,189 cars. Nonetheless, car ownership totals had much lost ground to recover.

Car ownership in 1955 fell to its lowest post-World-War II total. It's estimated that car ownership was at 1,700,000 units at the close of 1955. As of July, the figure climbed to 1,781,391 units.

With the current expected loss of production, as well as the further reductions in steel allotments that are expected to follow return of the mills to full production, carbuilding backlogs that were already into third quarter 1957 conservatively may go as far as early 1958.



A LOT of people are waiting to use this freight car, now in the final production stages at Pullman-Standard Car Manufacturing Co. Steel strike restricted production of cars while demand for them has not decreased.

INSURANCE: Are You Really Protected?

Rigid budget does not rule out adequate coverage . . . Place the emphasis on protection against catastrophe which might put you out of business . . . Coinsurance lowers rate—By F. J. Starin.

◆ INSURANCE is something every metalworking company carries. Yet every year a number of these insured businesses will fold after a serious catastrophe, while others in similar circumstances will live to sell another day.

The answer: make sure your insurance is where it will do the most good. Operating under a rigid budget with only a fixed amount allotted for insurance need not rule out adequate coverage.

Here is a formula that Sidney J. Flanigan, vice president of Frank B. Hall & Co., Inc., insurance brokerage house, suggests as guideposts to proper coverage.

Place the emphasis in your insurance program on protection against catastrophes which might put you out of business.

Third Party

One of the most important places to be insured, according to Mr. Flanigan, is for third party liability, damage to someone else's person or property. Law suits along these lines can be the costliest.

Also essential, especially in a field where competition for available markets is keen, is business interruption insurance. This, in theory places a business in the same position it would have been had no interruption occurred. Since an insurance company must foot bills only as long as a business can not produce, it has the incentive to make every move possible to get a business back on its feet.

The money spent on these two forms can be balanced by taking property damage insurance with deductibles or a coinsurance clause.

Deductible makes the insured liable for damage up to a stipulated figure. The insurance company shoulders the balance.

Coinsurance is insuring a prop-



FIRE to prevent fires are intentionally set on a life-size scale at engineering labs of Associated Factory Mutual Fire Insurance Companies, Norwood, Mass. Information gained is made available to all industry.

erty for only a fraction of its value. With such a clause the insurance company will stand liable for the percentage of any loss equal to the percentage to which the property is insured.

Mutual

There are several methods of placing insurance. Mutual insurance companies owned by their customers, are more cognizant of specialized industry problems. For instance, six of twelve members of Philadelphia Manufacturers Mutual Insurance Co. board of directors are metalworking executives.

In addition PMMI is a member of Associated Factory Mutual Fire Insurance Companies, a group which features an engineering division complete with laboratory to test and develop fire fighting and prevention apparatus. And an appraisal service is also available.

Insurance brokers usually fea-

ture service and flexibility. A broker can place policies with a number of companies depending on their specialties and rates. A good broker will arrange for immediate coverage, and then make suggestions for reducing premiums by certain improvements.

Because a broker does not work for the insurance company, he is in effect your representative in going after a difficult claim.

Brokers will help you understand the most important part of your contract—exclusions. This is the part of the policy which stipulates under what circumstances you are not covered.

It is relatively simple to check to see if your broker is earning his commissions. Any competitor will review your program without cost or obligation on the assumption that if he can make improvements he will get your account.

METAL LATH: Outstripping Competition

Highly competitive market keeps producers stepping . . . Gypsum is the biggest rival . . . But technological advances give metal lath a production edge . . . Guarded trade secrets the mode—By T. M. Rohan.

♦ ONE SEGMENT of metalworking — metal lath for plastered walls—is getting more and more like a carnival wrestler who takes on all comers.

More than a century ago it appeared on the market as a fireproof, punched-iron-sheet substitute for wood lath. Today, it also competes with gypsum lath, concrete, tile, brick, clay and movable walls of sheet steel.

Trade Secrecy

Output, spread among 11 producers, continues a steady rise. Tonnage this year, including accessories, will be about 135,000, mostly in sheet and strip. This is about 63 pct above the 1953 total of 85,000 tons and 6 to 8 pct ahead of last year.

Competition within the industry is terrific. Each producer has his own specially designed machines, built by custom machinery makers. Some keep their equipment behind locked doors. Most shops make their own tools and fixtures,



WORKER TIES two sections of metal lath ceiling. Once plastered, it offers unusual fire resistance.

as much for secrecy as to keep quality high.

Biggest new technical development is a continuous lath-making machine which would produce the material from coils. At present, all are either the guillotine or rotary type and process cut lengths of sheet and strip. Biggest drawback is cost of investment in such a highly competitive industry and lack of a big market potential for machinery makers.

Unions Cooperate

Best boost the industry has had this year is increasing union acceptance of guns which spray plaster quicker than men with trowels.

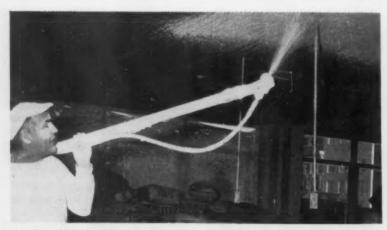
One of the leading competitors in the home building and low cost construction field is gypsum lath. In some cases, depending on type and arrangement of walls being put up, gypsum can cost slightly less but in general the two types are competitive on installation cost.

On commercial and industrial building, metal lath is used extensively because of low incidence of cracks, and fireproofing qualities. The cracks are minimized because stress and strain caused by thermal changes, building movement, impact, and shrinkage are spread over the entire surface.

Low Fire Hazard

Metal lath has a low fire insurance rate. Ratings are based on fire tests of the American Society of Testing Materials.

Protection of steel beams in buildings against loss of strength from fire is another growing application for plastered metal lath. Although used for many years, this economical membrane fireproofing is getting an additional spurt from new lightweight aggregates and their application with spray guns. Lath is wired in place around beams and plaster sprayed on. Ceiling beams are also made more fire resistant by making suspended ceilings from plastered lath.



PLASTER SPRAY GUN takes the time, expense, and ache out of plastering a ceiling. Metal lath is particularly suitable for this method of application and is most used in commercial and industrial construction.

FLOOD: Chase Tries Ounce of Prevention

On the first anniversary of the Naugatuck River Valley flood one of the hardest hit victims tells what it is doing to prevent a recurrence... President signs flood insurance bill.

◆ ONE YEAR ago next Sunday— Aug. 19—New England's Naugatuck Valley was hit by the worst flood in the area's history.

Industry suffered tremendous damage. Particularly hard hit was the region's copper and brass industry. And among these companies, was Chase Brass & Copper Co., Waterbury, Conn.

THE IRON AGE queried Chase on what it had done to protect its plant should another freak combination of the elements generate flood conditions. The answer was, plenty.

But at the same time, Chase points out that the one real hope of preventing a recurrence lies in Federal Government construction of protective dams.

Dam It

Says Walter L. Smith, vice president in charge of operations:

"The only hope of averting another such disaster lies in the ultimate construction of the proposed Thomaston Dam, as well as the planned tributary dry dams now under consideration by the Army engineers. Until those dams are in operation, Chase is at the mercy of floods of proportions of the one of Aug. 19, 1955."

It cost Chase about \$12 million to recover from the 1955 flood (IRON AGE, Sept. 8, '55, p. 40).

The company has prepared and circulated to key personnel a manual of instruction outlining emergency steps to be taken. These cover everything from a system of higher water warnings to the actual duties to be performed in proportion to the extent of the threat.

Banks of the Naugatuck River which were washed out have been rip-rapped. The private bridge to company property on the other side of the river, destroyed last August, has been rebuilt several feet higher. Piers were done away with. New bridge is single span.

Huge banks of sand and gravel have been placed at the upstream end of the mill. In case of a flood adjoining roads and the railroad trestle would be closed off. Bulldozers would be thrown into action to push the sand and gravel into dikes.

A number of innovations were made in rebuilding the pump house, filter house, electrical nerve center and power house designed to minimize possible damage. Emphasis was placed on the power house since the 1955 flood caused an explosion which resulted in tremendous and costly damage.

The river wall has been raised by three feet along the length of the property.

Meanwhile, the Associated Fac-

tory Mutual Fire Insurance Companies report several other methods devised by the Farrel Foundry & Machine Co., Waterbury, Conn., for protecting its plant.

Shutoff valves have been installed on all waste water drains, and sandbags are readily available to prevent sewers from backing up into the yard.

Potential flood gates, consisting of angle irons or H beams attached to walls, have been set up at every entrance. In case of trouble 4 x 6 timbers will be dropped into the frame to form a wall, and pinned to prevent floating. The entire structure will be covered with canvas and anchored by sandbags at the bottom.

President Eisenhower has signed into law a bill by which the Government will set the rate which will be charged for flood insurance, then pay 40 pct of this fee. Coverage is limited to \$250,000 per business, with deductibles.



RAISING the river wall by three feet will help keep the Naugatuck River on its current course past Chase Copper & Brass Mill, Waterbury, Conn.

EXPANSION IN INDUSTRY

For Small Business

Small business firms, especially in the manufacturing industries, need help if they are to remain liquid and grow normally, a special presidential advisory committee declared. It also recommends 14 moves to bolster small firms.

The committee, composed of the top members of the Eisenhower Cabinet, points out that the impact of the enormous increase in the burden of federal taxation over the last 25 years has been especially severe on small business which have little or no access to public markets for capital.

If small firms are to grow, the report says, they must have the means to expand plant, equipment, and markets by ploughing back profits. Reduction of the basic corporate tax rate from the present 30 pct to 20 pct on the first \$25,-000 of income is the first step. Other recommendations include: accelerated depreciation on purchases of used equipment up to \$50,000 a year, corporations with 10 or fewer stockholders be given the option of being taxed as partnerships, estate taxes on closely held businesses be liberalized. payment of progress payments on government contracts be speeded up, the maximum issue of securities which can be exempted from registration be increased from the present \$300,000 to \$500,000, antitrust enforcement and merger control be tightened up, and paperwork burden on small firms be reduced.

The recommendations of this committee will no doubt be presented to Congress when it reconvenes this fall.

Seaway:

Alco lands another
St. Lawrence contract.

Alco Products, Inc., Schenectady, N. Y., has received another fabrication contract from the New York State Power Authority for components for the St. Lawrence River Power project.

This brings total business Alco has received for this project to about \$5 million.

Latest contract calls for Alco to build 240 trash racks, suspension metal work for 34 diversion tunnel gates, and a variety of steel stop lags and lifting beams for the Barnhart Island Power Plant, Long Sault Dam, Massena Intake.

Expansion Briefs

Republic Steel Corp., Cleveland; expansion of titanium melting, preparation, forging and laboratory facilities at plants in Canton and Massillon, O.; cost about \$8 million; boost production to about 12 million lb per year.

Sonken-Galamba Corp., Kansas City; adding 30,000 sq ft to Miami, Fla., branch for production of aluminum billets.

Lea Manufacturing Co., Waterbury, Conn.; abrasive manufacturer; now operating in third section of the new plant still under construction.

Edgewater Steel Co., Pittsburgh; new tempering and annealing furnaces, and cleaning equipment to be installed at the Oakmont, Pa., plant; new buildings will be constructed early 1957.

Joseph T. Ryerson & Son. Inc., Chicago; new two-span warehouse to be built in Indianapolis, Ind.

Taking the Lumps Out of Ferro Handling



MOBILE EXCAVATOR unloads ferromanganese from 40-ton casting car at U. S. Steel's Duquesne Works. The new handling system is streamlining the course of this steelmaking alloy from blast furnace to shipping point to bring handling efficiency abreast of production. The excavators dig the ferro chunks from casting cars, sending it on to crusher.

B.F. Goodrich



3000-degrees hot but doors don't melt

A typical example of B. F. Goodrich improvement in rubber

THERE'S melted steel inside those big furnaces. Temperature is 3000 degrees. The heavy steel doors would melt in minutes except for that hose that carries a stream of cooling water in and out of them.

But hose was burning out in months or even weeks. It had to stand heat 24 hours a day, seven days a week, was often banged by big "charging machines," spattered with hot metal. Then B. F. Goodrich developed a new kind of hose made of wire, asbestos and rubber. It had been in use more than a year when the above picture was taken. It is less expensive than the hose

used before, is much lighter and more flexible, easier for workmen to handle. One man can install it where two men were needed for other hose.

B. F. Goodrich has made hundreds of improvements in dozens of kinds of hose to make them last longer, cost less, save your time and money. Most improvements, while making the hose stand more abuse, have also made it more flexible and easier to handle. B. F. Goodrich makes hose to carry almost anything—air hose that stands sharp flying rocks outside and hot oil inside, burstproof steam hose that can't burst even if it wears out, hose that

lasts for years carrying gasoline, paints, chemicals, even dry materials such as flour or cement.

Call your B. F. Goodrich distributor for more information about any kind of hose, belting or other rubber products. B. F. Goodrich Industrial Products Company, Department M-723, Akron 18, Obio.

B.F. Goodrich

INDUSTRIAL PRODUCTS

No. 2 of a Series

INDUSTRIAL TRUCKS: A Big Lift In '56

With producers spending heavily for capital improvements, this segment of industry is experiencing its best sales year . . . New companies, variety of equipment offered are signs of a growing market.

♦ THE INDUSTRIAL truck and tractor industry chugged through the first half of 1956 at levels 40 pct ahead of 1955's record production. With the pace certain to be maintained during the second half, shipments by the industry are expected to pass the \$500 million mark this year.

All signs point to heavy expansion within the industry, more new firms entering the market, sizable technological advances and marketing of a greater variety of material handling equipment. All are signs of a growing young industry.

Largely responsible for this growth are two factors:

- 1) Steadily rising labor costs throughout the economy.
- 2) Need for speedier material handling to keep up with faster production machinery.

The U. S. Census of Manufacturers shows that value of shipments in the industrial truck and tractor industry in 1954 was \$242.9 million compared to \$162.2 million in 1947. In 1955 sales jumped more than 100 pct over 1954. One of the industry's big customers in this year of huge capital expenditures is the steel mills.

Standardization on a large scale within the industry is not feasible because industrial truck requirements are so variable. This makes the field a fertile one for small companies. Consequently, the number of firms in the industry increased from 196 in 1947 to 244 in 1954—a jump of 24 pct. Geographical location of the plants is widespread.

Employment Up

More designers are being put to work to keep up with technical demands of industry. Non-production employees in these firms have increased 9 pct since 1947, reflecting employment of more engineering personnel. Total employment rose from 13,900 in 1947 to 15,700 in 1954 — an increase of 13 pct.

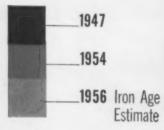
Although gasoline - powered, fork-lift trucks are the industry's mainstay—they outsell all other equipment 4 to 1 — improvements in other types are adding to sales appeal.

Development of the long-life battery, for instance, is making the electric truck more versatile.

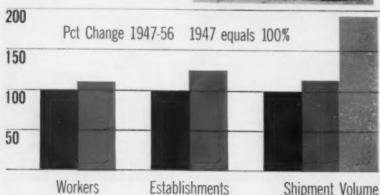
Some other general design improvements: lifting speeds have been increased as much as 50 pct, turning radii made tighter, engine power increased, precision controls improved, gradeability and tractive efforts developed and safety features added.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Services Dept., The Iron Age, Chestnut & 56th Sts., Philadelphia 39, Pa.

An Industry Grows Up







Source: 1954 Census of Manufactures.

Shipments in '47 dollars

Adjustable Speed Is Your Drive Problem in this List?

AIRCRAFT	FOOD	METAL	TESTING
INDUSTRY	PROCESSING	WORKING	☐ Engines
☐ Wind Tunnels	Mixers	Rolling Mills	Pumps
Dynamometers	☐ Dryers	Presses	
Accessory Testing	Conveyors	Winders	Motors
	Mills	☐ Slitters	☐ Auxiliaries
AUTOMOTIVE INDUSTRY Conveyors Machine Tools Presses	GRAPHIC ARTS Main Presses Press Auxiliaries Winders	Loop Cars	☐ Wind Tunnels
		PULP AND PAPER	TEXTILES
☐ Dynamometers	☐ Slitters	Paper Machines	Winders
	MATERIALS	Auxiliary Helpers	Slashers
CALCINED	HANDLING	Converting Machines	☐ Dryers
PRODUCTS	Conveyors	Finishing Machines	☐ Batchers
Kilns	Cranes	Pulp Processing Machines	
Fans	☐ Shovels		
☐ Feeders	Lift Trucks		UTILITIES
Conveyors	MINING	RUBBER AND PLASTICS	Fans
CHEMICALS	Conveyors		☐ Boiler Feed Pumps
Pumps	☐ Hoists	☐ Extruders	☐ Feeders
Conveyors	Mills	Plasticizers	
Process Machinery	_	☐ Calenders	
Winders		☐ Winders	
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Eddy-Current Equipment Can Be the Solution

Using standard AC lines as a power source, Dynamatic torque transmitting equipment satisfies most stepless adjustable speed requirements. Dynamatic Ajusto-Spede® and Dynaspede® Drives, Couplings, Brakes, and Dynamometers with electronic or magnetic amplifier control provide the advantages of rapid response, wide speed range, quiet operation, low power losses, low maintenance cost, and remote control.



Send for your free copy of the Dynamatic Bulletin GB-2, which illustrates and describes eddycurrent adjustable speed rotating equipment.

ATO

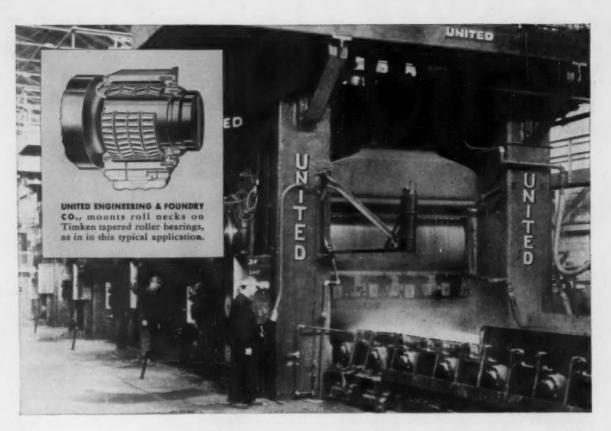
DYNAMATIC DIVISION

MANUFACTURING 3307 FOURTEENTH AVENUE

COMPANY KENOSHA, WISCONSIN

August 16, 1956

63



Another record! TIMKEN bearings on this plate mill have rolled 9 million tons of steel

THIS 100"4-stand continuous plate mill — built by United Engineering — went into service at U. S. Steel's Homestead Works in 1936. Some of the Timken® tapered roller bearings on work rolls and back-up rolls have now rolled 9 million tons of steel—all 31 Timken bearings in the mill have rolled an average 5 million tons.

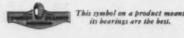
One big reason for this record is the fact that Timken bearings practically eliminate friction. They're geometrically designed and precisionmade for true rolling motion. Timken bearings offer low frictional resistance. Higher rolling speeds are possible. Acceleration is easier. There's less skidding and scuffing between rolls. Less repair and maintenance.

By holding rolls rigid, Timken bearings help insure "on-gauge" operation, reduce scrap loss. And by holding shafts and housings concentric, Timken bearings make closures more effective, reduce lubricant leakage. Cut lubricant cost. Grease-lubricated Timken bearings require no tubes, pipes or reservoirs—cut lubrication system maintenance. No extra thrust devices are needed—the tapered construction of Timken bearings lets them take radial and thrust loads. Chuck mountings are more compact. Mill design is simplified.

Tonnage records indicate that the long life of Timken bearings keeps bearing cost per ton of steel rolled to a minimum. And prolonged roll life is assured because Timken bearings provide maximum roll neck strength, less wear. Mills using balanced proportion Timken roll neck bearings increase roll neck strength up to 60%—load ratings up to 40%. The balanced proportion design per-

mits large diameter roll necks without increasing bearing O.D.—maximum capacity in less space.

For lowest cost per ton of steel rolled, look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas. Ont. Cable: "TIMROSCO".





TIMKEN

TAPERED ROLLER BEARINGS ROLL THE LOAD

Old Debbil Inflation

You'll be hearing more about inflation in months to come. Steel prices, increased about \$8.50 a ton following settlement of the steel strike, have raised the red flag. President Eisenhower is concerned.

He referred to the price hike

as "one of the things that holds up a danger sign" of inflation. Government economists and the Federal Reserve Board are keeping an eagle eye out. So you can expect the government to tighten the credit screw another notch if things show signs of getting out of hand.

But it isn't likely

that a change in the discount rate would be put into effect by the Federal Reserve System before Sept. 1. The "Fed" is likely to hold its peace until the situation has had a chance to shake itself down.

July and August are regarded

as slow business months by the "Fed." It will wait until more normal business activity takes hold in September before making a move, if it's necessary. Meanwhile, you can count on the Board to step up its open market operations.

Probable New Rate

If and when the discount rate hike does come, it probably will go up to a minimum of 3 pct. Current discount rates vary from 2¾ pct in the Minneapolis and San Francisco districts to 2½ pct in the remaining 10 districts.

With the election coming

up soon, a serious round of price increases and counter-price increases could have an effect on the thinking of Mr. John Q. Voter.

The Federal Reserve Board

last April foresaw the current inflationary forces building up, and raised the discount rate $\frac{1}{2}$ to $\frac{3}{4}$ pct despite protest from some sources.

An Expert Viewpoint

John S. Sinclair, president of the National Industrial Conference Board, says that controlling inflation and establishing beneficial foreign economic relationships are the nation's two most pressing problems.

"If either is ignored

or allowed to drift," he said, "it could be that this country is approaching the end of its own Golden Age."

We cannot lose sight of the fact

that since the late Thirties, the purchasing power of the dollar has declined by nearly one half. Nor can we be complacent about the present situation, says Mr. Sinclair. To do so would be inviting a lot more trouble than we ever dreamed.

Our trillion-plus

in national wealth is accompanied by a total debt estimated at \$650 billion, plus hidden debt commitments of the guaranteed or welfare type, according to Mr. Sinclair, who adds that there is always danger of pressure to tighten so large a debt burden by creating still more inflation.

In Mr. Sinclair's opinion

confidence in the soundness of our money has already weakened in the past two decades. It would be tragic to have that confidence degenerate further, he warns.

Statistics That Don't Lie

Signposts that have the experts hoisting the storm warnings are reflected in U. S. Department of Commerce statistics.

Personal income in June

totaled \$324.2 billion. That's \$1.4 billion higher than May, and \$18.2 billion above June, 1955. Meanwhile consumer credit outstanding has risen steadily for the past three years to an estimated \$36 billion.

INDUSTRIAL BRIEFS

Old Vienna . . . Fifteen free world nations will participate in the Vienna Trade Fair, Sept. 9-16. Exhibits will range from agricultural equipment, through metalworking and including wine sampling.

Floating Island... A new 148-ft towboat to serve the expanding coal trade on the Ohio River has been christened the "Raymond E. Salvati," in honor of the president of Island Creek Coal Co. The vessel was built by Dravo Corp. for Island Creek Fuel & Transportation Co., Huntington, W. Va.

Water For the Sheik . . . The Sheikdom of Kuwait, which operates a seawater evaporator plant, will double the production of drinking water for its capital city by installing two new flash-type Westinghouse water evaporators, each capable of producing 1.26 million gallons of fresh water daily.

Multi-Merger . . . The merger of Thermistor Corp. of America and Vibro-Ceramics Corp. with Gulton Mfg. Corp. has changed its name to Gulton Industries, Inc. Thermistor and Vibro-Ceramics will operate as divisions of the new organization, as will Engineered Magnetics, Culver City, Calif., a division of Gulton Mfg. Corp. General offices and main operating plant are located in Metuchen, N. J.

Crane and Crawler . . . A 34 yard shovel and 18 ton crawler crane has been introduced by Marion Power Shovel Co. of Marion.
O. It will be known as the 35-M and will be offered both with crawler and truck mountings. The truck crane will be known as the 35-MR and is rated at 25 tons.

To Each His Own . . . Reynolds Metals Co., aluminum manufacturer, and The E. F. Hauserman Co., manufacturer of movable interior walls, have teamed up to introduce a new line of lightweight aluminum movable partitions for office, factory and institutional interiors.

Metal Method . . . A \$200,000 development contract has been awarded to Horizons Inc. by the Navy Bureau of Aeronautics. The contract covers the development of a commercial method for producing virgin titanium metal by an improved Horizons' electrolytic process.

What's With Radiation . . . Mellon Institute will initiate a major research effort in the field of peaceful atomic energy applications. The institute has established a new Dept. of Radiation Research, employed a radiation chemist, and purchased a 3-million-volt Van de Graaff particle accelerator as its radiation source.

Bravo Dravo . . . Dravo Corp., Pittsburgh, has been selected by Westinghouse Electric Corp. as installation contractor for an atomic energy reactor at Shippingport, Beaver County, Pa. This reactor will be the source of heat for the nation's first full-scale, nuclear-powered generating plant, now under construction.

Which's Which . . . The Register of Planned Mobilization Producers has been distributed to major military procurement and planning offices. It is a Dept. of Defense publication which serves as the joint Army-Navy-Air Force industrial directory for planning with American manufacturers for the production of military materiel in event of war emergency.

Shenango Fandango . . . Shenango-Penn Foundry operations at Sharpsville and Neville Island, Pa., and centrifugal casting operations at Dover, O., will become divisions of the Shenango Furnace Co., with headquarters in Pittsburgh. The company is engaged in the production of iron ore transportation and foundry operations.

Progress in a Vacuum . . . A process involving use of a vacuum furnace to produce metal free of impurities normally found in air melted ingots, has been put into operation at Armour Research Foundation, Illinois Institute of Technology. The ferrous metal capacity of ARF's vacuum melting furnace is 50 lbs.





How Great Lakes Steel blends quality



COKE OVENS eject tons of flaming, quality controlled coke into cars for rapid delivery to quencher. Then . . .



SAMPLES ARE ANALYZED carefully to determine the amount of sulphur in the coke used in the blast furnaces.

Take five kinds of carefully selected soft coal. Blend well. Bake in a 2500° oven for 15½ hours. And if every step has been checked and double checked, the way it is at Great Lakes Steel, presto! You get pure, hard coke—the vital ingredient for reducing ore to high-quality pig iron.

Above, you see Great Lakes special coke recipe (cut in millionths, of course) being checked for ash impurities, a very important step in the complete analysis.

First, a sample of each kind of coal is burned to a cinder in the test furnace. Then the painstakingly mixed blend gets this dress rehearsal heat treatment, too. And this makes doubly sure that the blast furnaces produce quality iron . . . iron to make steel that meets customer specifications to the letter!

Quality control from raw materials to finished product—that's Great Lakes Steel! May we help you?

GREAT LAKES STEEL CORPORATION

Ecorse, Detroit 29, Michigan . A Unit of



District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.



Curtiss-Wright Rides To The Rescue

Deal between Curtiss-Wright and Studebaker-Packard has advantages for both... Eventual merger possibility... Curtiss-Wright still has a way out should S-P flounder... Defense contract angle—By T. L. Carry.

 FORMAL AGREEMENT between Curtiss-Wright and Studebaker-Packard sets the stage for two events—the rescue of S-P's automotive business and the eventual merger of the two companies.

Here is how the rescue operation is going to work: Curtiss-Wright will pay Studebaker-Packard \$35 million for long term leases on the Packard engine plant in Utica, Mich., and a Studebaker plant near South Bend, Ind. In addition, Curtiss-Wright gets the Aerophysics Development Corp. in Santa Barbara, Calif. The company will do defense work in all three of these plants.

Studebaker-Packard will operate as a separate company with its own board of directors but with Curtiss-Wright guidance for a 3-year period. All automotive production under this setup will be moved to South Bend.

Curtiss-Wright also has an option to buy 5 million shares of S-P common stock, which is yet unissued, at \$5 per share. If and when the purchase is made, it will give Curtiss-Wright controlling interest in S-P.

Why No Merger . . . There are several reasons why Curtiss-Wright didn't merge outright with Studebaker-Packa d:

First is the nature of the Curtiss-Wright Corp. 1: is a company that has steadily diversified itself and moved away from near-complete dependence on military business. Right now 40 pct of its production is for civilian purposes.

Secondly, the agreement reached by the two firms leaves Curtiss-Wright in the position where it can bow out gracefully in case Studebaker-Packard starts to go down for the count. It is no secret that S-P has been on the ropes for months and it is going to take some hard work and a few miracles to pull it out of the hole. Curtiss-Wright doesn't want to be in the position where it will be saddled with the company if it starts to flounder seriously.

Thus, Curtiss-Wright has put itself in the position where it can take or leave Studebaker-Packard as market conditions dictate.

Defense Angle . . . At the same time, S-P now has the opportunity to get some very badly needed new financing. The possibility of more and bigger defense contracts holds out to the company the promise of having at least some income while it is in the process of rearranging its merchandising methods for a new attack on the automotive market.

Also, Curtiss-Wright has agreed with Daimler-Benz, AG of West Germany to develop diesel and gasoline engines for automotive, marine and military use.

This could lead to the marketing of Mercedes-Benz autos in this country by franchised S-P dealers and would be an additional source of income for the hard-pressed dealer organization.

The new approach which Studebaker-Packard will use on the auto market has led to speculation that the line of Packard automobiles will be dropped completely and that the company will concentrate on fewer models

Both Benefit . . . Nobody knows if this will be the case, but it is

Justice Department Takes A Look

Antitrust lawyers in the Justice Department are taking a close look at the complicated new agreement between Studebaker-Packard and Curtiss-Wright. Despite official silence, the government believes it has most of the details of the agreement, and is pondering what it will mean to competition.

The agreement involves primarily a financial rescue of the shaky auto firm, but could in two years permit Curtiss to gain stock control of Studebaker-Packard.

Curbstone guess is that the government won't object, following its reasoning two years ago when Studebaker and Packard combined that "anything that helps the independent auto makers helps—not hinders—competition in the car business."



"A wing and a prayer" ...and plenty of nuts and bolts!

ABOUT A THOUSAND assorted nuts and bolts keep this airborne performer in one piece despite the beating it takes show after show.

Obviously, the fasteners that keep the parts together have to be strong and flawless to stand up under the terrific stresses.

They do a big job, these standard fasteners. Take the automotive industry alone — over 10 billion fasteners used last year!

RBAW-A MAJOR SUPPLIER TO INDUSTRY

A leader in the field for over 111 years, RB&W turns out the finest fasteners possible to meet the insatiable needs of automotive and other major industries.

Modern facilities, new techniques, long experience...all combine to make RB&W fasteners truly the "strong point of any assembly."

SEND FOR THE REAW "FASTENER MAN"

If the product you make is assembled with fasteners, chances are the RB&W "Fastener Man" can find a way to save

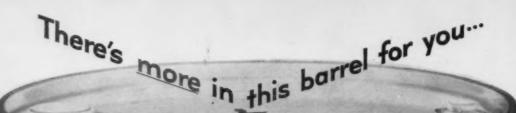
you money. He can recommend and supply the right standard fastener for just about every job. Contact your nearest RB&W office.



RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

Plants at: Port Chester, N. Y., Coraopolis, Pa.; Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at: Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. Sales agents at: Milwaukee; New Orleans; Denver; Seattle. Distributors from coast to coast.

RB&W FASTENERS - Strong Point of any assembly



James P. Gavin, Socony Mobil engineer, (right) helps diagnose lubrication problem on a paper calender.

MORE PRACTICAL EXPERIENCE to help you improve production and cut costs!

Specify Socony Mobil and you get the benefits of more practical lubrication experience than is offered by any other oil company.

Our representatives are long on experience-average well over 15 years of service. In addition, they can make use of our vast store of case histories and technical data amassed since 1866. All this practical knowledge and written experience is available to you to help improve your production and cut your manufacturing costs.

Socony Mobil products are also backed by more field engineers serving industry . . . more continuous research to assure continually improved products . . . more services for analyzing petroleum products in use . . . more on-the-job training of your personnel in correct product application . . . more approvals from machine builders.

Always specify Socony Mobil. There's more in every barrel for you!

SPECIFY

SOCONY MOBI



FIRST STEP IN CUTTING COSTS

SOCONY MOBIL OIL CO., INC., and Affiliates: MAGNOLIA PETROLEUM COMPANY
GENERAL PETROLEUM CORPORATION

FUELS • CUTTING FLUIDS • WAXES • SOLVENTS • PLASTICIZERS • PETROCHEMICALS

Automotive Production

(U. S. and Canada Combined)

WEEK	ENDING		(CARS	TRUCKS
AUG.	11,	1956	1	10,023	21,230
AUG.	4,	1956	1	18,255	22,734
AUG.	13,	1955	1	51,505	24,310
AUG.	6,	1955	1	46.813	23,191

*Estimated. Source: Ward's Reports

possible. Packard had planned some major changes for next year before it ran out of money. The face-lift version which was finally settled on for 1957 has still not reached the production stage. But the company says that the new model could be produced at South Bend.

In any case, each company seems to be getting a good deal out of the agreement. Curtiss-Wright isn't sticking its financial neck out too far and Studebaker-Packard is getting some badly needed money with which to take another crack at the highly competitive automotive business.

Chrysler Changeover

Chrysler Corp. begins its model changeovers this week. The duration of the changeover will vary from plant to plant.

Certain of the corporation's vendor and supplier plants will begin production of new model subassemblies even before some assembly plants complete current model production.

Some 35,000 workers will be affected by the changeover but they will be laid off at different lengths of time for periods of from two to four weeks.

Production of the new cars is scheduled to start in early September. Plans call for an adequate buildup of stocks through early October for mid-fall introduction.

Real Estate Deals

Two significant purchases were announced last week. Cadillac has bought the old Hudson Motor Co. plant on Detroit's east side and Chrysler Corp. has acquired some

1700 acres of land in Troy Township just outside Detroit.

The Cadillac purchase adds one million sq ft of floor space to the company's facilities. The building will be used primarily for fabricating sheet metal parts. Present plans call for complete renovation before operations begin in 1957.

L. L. Colbert, Chrysler president, says that although the company is not planning on building at this time, the land was bought for possible future expansion on Chrysler's engineering and research departments.

Aluminum:

American Motors develops aluminum die-cast V-4 engine

A new, aluminum die-cast V-4 engine has been developed by the Special Products Div. of American Motors Corp.

George Romney, AMC president, says the new engine is one of a versatile "family" that can be produced in sizes ranging from 2 to 8 cylinders in either V-type or horizontally opposed arrangements.

It can be used to power small

AUTOMOTIVE NEWS

military vehicles, small passenger cars or for stationary equipment such as pumps and generators.

The Aluminum Co. of America worked with AMC engineers in developing the new engine and designing it for the extensive use of light metal.

The engine contains 70 lb of aluminum and reflects many advances in design. For example, the cylinders are individually die-cast of aluminum and the bores are chrome plated for durability. Cylinder heads, covers, and timing gear housings also have been designed for die-casting which reduces machining time, weight and

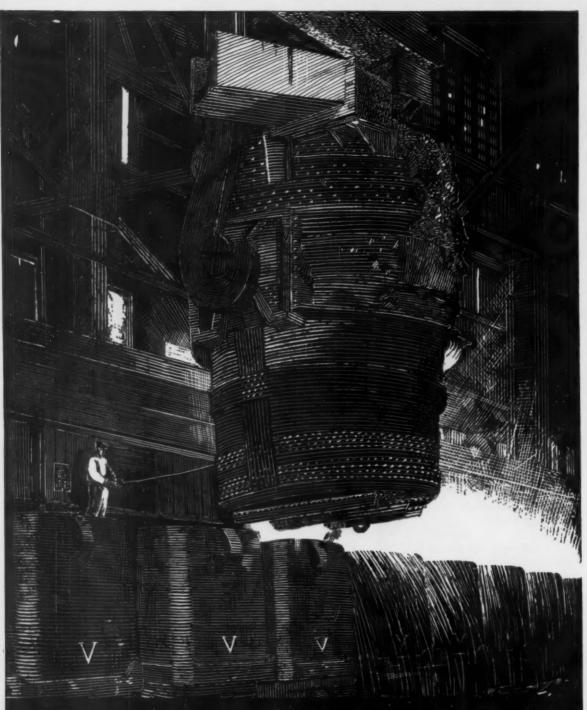
The V-4 takes up only about half the space of conventional engines. Although it develops 62 hp, it weighs only 200 lb. It has a displacement of 108 cu in. and a compression ratio of 7.5 to 1.

Its bore and stroke are 3.25 x 3.25.

THE BULL OF THE WOODS

By J. R. Williams





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General Offices: HUBBARD, OHIO

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Suez Crisis Speeds Fast-Tax Action

Mobilization officials now see urgent need for Jones & Laughlin's proposed Texas tube mill . . . Oil country goods shortage feared . . . Certificates of necessity may be coming soon for special cases—By G. H. Baker.

◆ THE SUEZ CANAL crisis is strengthening the likelihood that Jones & Laughlin will gain from the government a fast write-off certificate on its proposed new Houston, Tex., pipe mill.

J & L is seeking fast amortization privileges on the grounds that increased output of oil-country goods is essential to the national defense effort.

And because of the Suez threat and the resulting possibility that the United States may be cut off from supplies of Middle East oil, the pending J & L application now looks better than ever to defense mobilizers.

New Sense of Urgency... Prior to the seizure of the Suez Canal by President Nasser of Egypt, U. S. mobilization officials had been moving slowly in appraising the J & L request for fast write-off on its proposed \$250 million integrated pipe mill. Now, because of Nasser's threat to the free nations, Washington officials are looking for new ways to encourage production and transport of U. S. oil.

They are seeking ways to encourage drilling of new wells. They are looking into ways of speeding up the transport of oil. (Any shortage of seagoing tankers will mean that many additional new cross-country oil and gas pipelines will have to be built—and built quickly.)

A Special Case . . . All this adds up to a continued huge demand for oil country goods of all descriptions, and there is every indication that the Office of Defense Mobilization approves of the J & L project and may award a certificate.

Here's what J & L proposed to erect in Harris County (near Houston): One blast furnace, four openhearth furnaces, one blooming mill, two seamless pipe mills, plus heat-treating, tempering, and finishing facilities.

Although fast amortization for all but a handful of defense industries has been suspended, due largely to Treasury Secretary George M. Humphrey ("we need the revenue"), the ODM nevertheless has full authority to award certificates in "special" cases. The J & L application looks more and more like a "special" case to mobilization officials.

More Shipbuilding

Government spending for shipbuilding in both military and clvilian shipyards will increase in the next 12 months. Congress voted the Maritime Administration \$82.7 million for ship construction and conversion subsidies, and \$18 million toward the nuclear-powered merchant ship. This compares with \$102.8 million last year.

Congress also approved legislation boosting from 90 to 100 pct the amount of a privately held ship mortgage eligible for government insurance.

Bills to aid domestic coastal ships and bring Great Lakes shipbuilding under the subsidy program failed.

Navy received a total of \$1.054 billion for this fiscal year's ship-building and conversion work, compared with \$995 million last year.

Atomic Ship

President Eisenhower has signed a measure authorizing the Maritime Administration to begin construction of the hull of the world's first atomic powered merchant ship. Atomic Energy Commission will build a new type of reactor for the \$40 million vessel.

They're Not All Bureaucrats

- Population of Washington, D. C. is generally supposed to be topheavy with government employees, but the new Census of Manufactures turns up the startling fact that 20,000 factory workers reside in the nation's capital.
- By occupation, here's the latest profile on the inhabitants of the District of Columbia:
- Government payroll, 230,000; printing and publishing, 10,739; food, 6,647; paper, 693; fabricated metal products, 415; electrical machinery, 275; chemicals, 223; apparel, 177; miscellaneous manufactures, 175; stone, clay, glass, 151.

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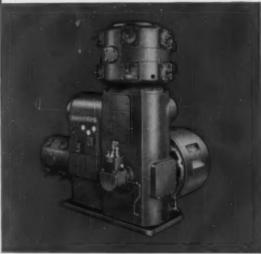
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other valve ever used. Channel valves are available only in I-R compressors.





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Is Ordnance A Diversification Dud?

Their business adds up to a healthy dollar total but West Coast ordnance makers are uneasy . . . Contracts narrowing down to just a few guided missile lines . . . U.S. dispersal policy spells trouble—By R. R. Kay.

• GLOOMY FACES greet you in southern California ordnance plants. Although Army ordnance makers have a \$1 billion backlog, they're not happy.

What's worrying and confusing them is this: Work coming here is shaking down more and more into guided missiles, research and development. And it looks as though this trend, most marked these past two years, will continue.

Manufacturers here welcome the business, to be sure. But they're thinking of the future. They feel all their eggs are in one basket: (1) They haven't enough product diversification, and (2) It leaves them on a hot seat every time someone shouts plant dispersal.

Political Mumbo-Jumbo... Dispersal is a naughty word here. Nub of the worry: Conflicting statements—too many and too often—by politicians and the military.

Ordnance makers are deep in the blues about the recently passed Bennett Congressional amendment to the Defense Production Act. The law of the land is: Federal agencies must encourage dispersal.

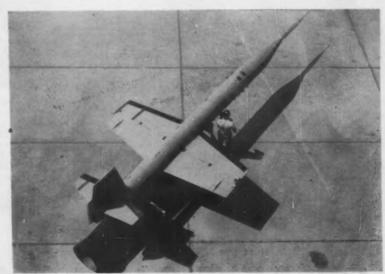
Why did Army ordnance come here in the first place? (1) To draw on the aircraft industry's aerodynamic know-how. (2) Heavy concentration of electronics manufacturers. (3) The \$16-million government owned jet propulsion laboratory at California Institute of Technology. (4) An increasing number of eastern branch plants

widening the range of equipment, materials and skills needed for ordnance work.

Ammo Plant Cure-all . . . Farwestern firms are getting fewer conventional hardware orders for fuses, opticals, and 20 mm, 105 mm, 155 mm shell casings and projectiles. A big percentage of this business is going east of the Rockies, where plants have one big advantage: they're nearer ammunition loading facilities. They have a big edge, too, in trimming freight costs.

Need for an ammunition loading plant in the Farwest was pointed up in THE IRON AGE, West Coast Report, Dec. 2, 1954. It's something contractors who manufacture ordnance here want desperately. They say that if the government puts one up, local manufacturers will make explosives and propellants. Then complete rounds could be loaded from West Coast components. That's just what they need to get their product more diversified. When and if they get it is another story.

In the cards: A bigger share of missiles work is on its way to northern California. Just south of San Francisco electronics and guided missiles manufacturing and research facilities are out all over. These new and expanding firms will be getting business as fast as they're ready to handle it.



VEIL OF SECRECY is removed from Lockheed's supersonic vehicle, the X-9, for several years used in developing new engines for USAF ramjet missiles. The X-9 is plane-launched and parachute recovered.



1. Cures "stick-slip" or "jumpy table". When a table gets the "shakes", especially after it has just reversed or when the load is heavy and the speed slow, it's probably suffering from "stick-slip". Remedy—Suncoo Way Lubricant®. Special polar compounds in Suncoo Way Lubricant form a friction-reducing film that keeps a table sliding smoothly under all operating conditions.



2. Doesn't squeeze out. When you use a heavy oil as a way lubricant, you must use a lot of oil to maintain a thick enough film. But, heavy oil squeezes out if the table sits in one position very long. You have a tough time getting the table moving again. Protected by the tenacious thin film formed by Sunoco Way Lubricant, the machine can be idle for a week and it will start easily.

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3. Protects expensive ways. Badly scored or pitted ways, caused by inadequate way lubrication, result in lost production and expensive repairs. The high film strength of Sunoco Way Lubricant eliminates the danger of metal-tometal contact, the chief cause of scoring and way wear. Excellent metal-wetting and non-corrosive properties eliminate rusting and pitting.



4. Approved by more than 55 machine-tool builders. Every major machine-tool builder has tested Sunoco Way Lubricant. It is always approved. In fact, to assure maximum efficiency of their product, many manufacturers ship a supply of Sunoco Way Lubricant with each machine. We'll be glad to send you the list of manufacturers who have approved Sunoco Way Lubricant.

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Foreign Policy In A Painless Way

Machine tool builders form export associations to compete in foreign markets . . . Groups have field men whose main aim is providing service . . . Amertool good example—By E. J. Egan, Jr.

♦ MANY U.S. machine tool builders have their own very effective way of lending American technical assistance to friendly but industrially backward nations. And Mr. Average Citizen will be glad to know that it doesn't cost even one thin dime of government funds.

Groups of builders making noncompetitive machine tools get together to form an export association. This doesn't flaunt U. S. antitrust laws; an official act of Congress (the Webb-Pomerene Law) permits American export combines to compete with similar groups from other nations.

Amertool . . . One of the best known machine tool export setups is Amertool Services, Inc. Sixteen well-known U. S. builder-members maintain a virtually no-overhead headquarters office in Cincinnati Milling Machine Co.'s administration building. Amertool president is Nelson F. Caldwell, who is also vice president and export sales manager of Cincinnati Milling & Grinding Machines, Inc.

Mr. Caldwell told The Iron Age that Amertool is currently represented in Germany, Austria, Jugoslavia, Japan, South Korea, Formosa and Latin America. Amertool field representatives live abroad. They are working constantly to dispense American machining know-how to anyone.

South of the Border... The Latin American operation is most extensive, uses the services of six engineers who are native to the area, speak Portugese and Spanish fluently. All have had rigorous training in Amertool member plants, take refresher trips occasionally, and can call on members for additional engineering talent.

Primarily, field engineers are expected to dispense advice and assistance rather than produce actual sales. They turn prospective customers over to the Latin American distributor representing the builder whose equipment is involved. Amertool headquarters retains part of the distributor's commission on such sales, uses it to pay salaries of field engineers and to conduct a vigorous advertising campaign in Latin America.

Export group members chip in

to maintain a revolving credit fund at New York's First National City Bank. Money is used to help sound-risk customers hurdle temporary dollar shortages and other credit difficulties.

Helping Hand . . . Mr. Caldwell says, "Amertool's prime aim is not to increase our machine tool exports, but to help other nations boost their own exports through more efficient production methods. Living standards will advance as these levels of industrial activity increase. The Amertool program is an excellent way to achieve these long-term economic objectives."



ADVERTISEMENTS, such as this, in local publications tell the story of Americal Services available to Latin American manufacturers.

CCF Lubricated Plug Valves ROUND PORT MEANS FREE FLOW

You get full volume, unrestricted flow throughout the entire piping system when you use QCf Round Port Valves.

The pipe-matching port openings cause no loss in head pressure—offer no more resistance to flow than the pipe itself. There are no obstructions—no turbulence and no harmful abrasive effects from solids in suspension. Even the most heavy viscous ladings flow freely through QCf Round Port Valves.

Split-second quarter-turn shutoff, non-wedging cylindrical plug, Teflon* head gasket, are additional advantages that add to perfect performance of QCf Round Port Valves—that mean extra long trouble-free service—lower maintenance costs and fewer work stoppages.

Act now to step up valve performance—to keep maintenance costs down. Representatives in 50 principal cities.

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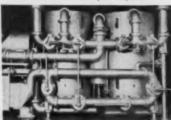
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The Iron Age

SALUTES

Albert M. Swank

President and board chairman of Hiram Swank's Sons, his knowledge
of refractories is backed up by 100 years of inherited skill in working the
fine clays near Johnstown, Pa. A flood couldn't stop him.

Albert M. Swank probably doesn't remember the score he made during a particular round of golf played back in 1915, but he remembers well the words of encouragement given him by his golfing partner:

"Our whole civilization is based on steel and without refractories you can't make steel."

The advisor was the late Charles M. Schwab, first president of U. S. Steel Corp. and founder of Bethlehem Steel Co.

Young Al Swank, just graduated from the University of Pennsylvania, was undecided whether to stay in the family business, Hiram Swank's Sons of Johnstown, Pa., or to strike out on his own. Schwab's statement settled the question. He went to work in his grandfather's clay mines for \$5 a week. Today he is the refractory company's president. The firm this year is celebrating its 100th anniversary with record sales of \$8 million.

An orphan at five years, al Swank was adopted by his grandfather. "As a child I sat at breakfast, lunch and dinner with this family of potters," he recalls. "I couldn't help but absorb the craft." At the age of eight, he whittled molds of wood, baked little bricks on a tinplate over a kerosene lamp and sold them as paving for toy streets under Christmas trees.

A good-humored, hearty man, Al Swank speaks with pride of his firm and its historical relationship with Johnstown. Floods had a critical effect on his company's growth. The great Johnstown flood of 1889 swept the plant away, and Hiram rebuilt it. In 1936, the year Albert was named president, another torrent demolished the plant. Faced with the problem that confronted his grandfather 50 years before, he was uncertain whether to rebuild the plant or call it quits.

Then he remembered the advice of an old friend. "What Charlie Schwab told me as a youngster still holds good today," Swank says. The future of the refractories industry is secure, he adds, "because God has given us good clay in abundance."



Through this | little hub . . . flows one of humanity's highest hopes

A dreaded shadow lifts, and the clear light of science once again drives back the outer darkness. Such a great event, so close to a miracle, is often then beset with technical problems. How to bring it to the millions who anxiously await it? How to give it to them exactly as it should be given, with scientific precision, for greatest benefit?

In this current contingency, one of mankind's oldest servants meets its opportunity to be of greatest service. That is why a special-shaped Bristol Brass rod is commonly used when forming the precisely dimensioned, tiny hub that is essential to effective administration.

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This Clearing hydraulic press has an automatic feeding table which speeds loading and unloading. A rubber pad in the ram substantially lowers die cost by taking the place of the upper half of the dies.



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A 2515

INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES . EQUIPMENT

The Iron Age INTRODUCES

Herbert F. Byrne, elected vice president, production planning, U. S. Steel Corp., Pittsburgh; Louis J. Rohl, elected vice president and chief metallurgical engineer; Joseph M. Greer, named general manager, production planning.

Richard P. Evans, named asst. to vice president, sales, New York, The Carpenter Steel Co., Reading, Pa.; Robert P. Uhl, named New York district manager; Charles E. Miller, named branch manager, Houston, Tex.; O. T. Thompson, named branch manager, Detroit; J. C. Murray, named asst. branch manager, Pittsburgh; Harry L. High, Jr., named asst. branch manager, Cincinnati.

Gustave S. Juliber, named controller, Great Lakes Carbon Corp., New York.

Cecil Barlow, named manufacturing superintendent, Greer Hydraulics, Inc., Jamaica, N. Y.; Melvin Schoenberg, named planning supervisor.

Harry W. Finney, named division superintendent, Saxonburg plant, U. S. Steel Corp.

John F. Scott, appointed district manager, Milwaukee, U. S. Supply Div., U. S. Steel Corp.

Paul Jones, appointed works manager, Borg & Beck Div., Borg-Warner Corp., Chicago. Following appointments are within the Pittsburgh Steel Products Div. of Pittsburgh Steel Co. Robert L. Glose, named sales advisor; Wayne O. Stoughton, named division's manager, sales; Thomas L. Griffith, appointed asst. manager, sales; Robert K. Lohman, appointed manager, material handling sales.

D. C. Stephens, named production manager, Goslin-Birmingham Manufacturing Co., Birmingham, Ala.; Carter E. Putman, named machine shop superintendent; J. E. Morris, named assembly shop foreman; R. E. McLane, named chief inspector.

John Strome, appointed manager, Chicago district office, Inland Steel Co., Chicago; William P. Goodman, named asst. manager; John G. Mack, Jr., named asst. manager, Bar and Semi-finished Steel Div., Sales Dept.

Harold W. Burney, named manager, Metal Improvement Co., N. J.; Daniel J. Nesin, named development engineer, shotpeening machinery, Los Angeles.

Robert C. Hodapp, named sales manager, Betz Div., Bohn Aluminum & Brass Corp., Detroit; Fred L. Bratt, appointed sales manager, fabricated products.

James P. O'Connor, Jr., named sales manager, Industrial Plastic Fabricators, Inc., Norwood, Mass.



BURTON R. BUCK, appointed vice president, Electro Metallurgical Co. Div. of Union Carbide and Carbon Corp., New York.



D. F. JURGENSEN, elected vice president, development and research, Blaw-Knox Co., Pittsburgh.



JAMES T. HARRINGTON appointed secretary, E. W. Bliss Co., Canton, O.



ANDREW V. WETZEL, named chief metallurgist, Cleveland Cap Screw Co., Cleveland.

Like to spend

more time

reading

and less time

hunting?

Turn to pages

two and three

The IRON AGE

Digest of the Week in Metalworking

help you find favorite features

Walter Poremba, named asst. sales manager, Alloy Precision Castings Co., Cleveland.

Kenneth G. Hubach, named sales manager, grating and bridge flooring, Reliance Steel Products Co., McKeesport, Pa.

Quentin H. Gessner, named sales representative, Allen Manufacturing Co., Hartford, Conn.; Harold M. Hattman, named sales representative; Nicholas T. Annelli, named sales office manager, Sales Dept.; M. Raymond Whigham, named sales promotion manager, sales training and exhibits.

James L. Hamilton, Jr., appointed Western sales manager, Mead-Morrison Div., McKiernan-Terry Corp., Harrison, N. J.

Leonard A. Wasselle, appointed manager, Boston office, The Rust Engineering Co., Pittsburgh; C. W. Churchill, Jr., named asst. manager, Boston office.

Lawrence J. Kuhn, appointed district traffic manager, central alloy district, Canton and Massillon, Republic Steel Corp.; Frederick W. Thomas, named district traffic representative, Berger Division, Canton, O.

Robert Thoren, named district manager, Rockford, Ill., Vickers Inc., Detroit.

Robert B. Heppenstall, Jr., appointed general manager, Ring Div., Heppenstall Co., Indianapolis, Ind., plant; Charles B. Cobun, named manager, ring sales, Indianapolis.

Leroy S. Young, named district manager, Detroit, Kaiser Aluminum & Chemical Sales, Inc., Chicago.

Jack D. Langer, named district manager, Memphis, Tenn., office, Luria Brothers & Co., Inc.

Elmer K. Stilbert, named staff manager, coating materials, Plastics Dept., The Dow Chemical Co.



DERRICK L. BREWSTER, named asst. general manager, sales, Inland Steel Co., Chicago.



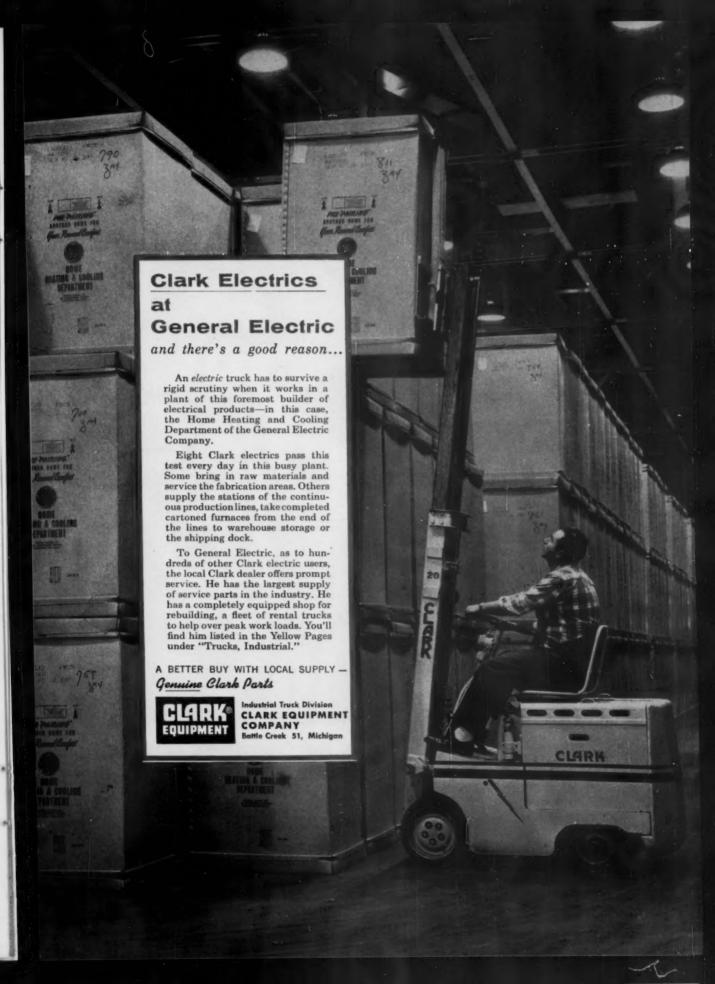
DONALD SAUNTER, named director, production and purchasing, Dodge Manufacturing Co., Mishawaka, Ind.

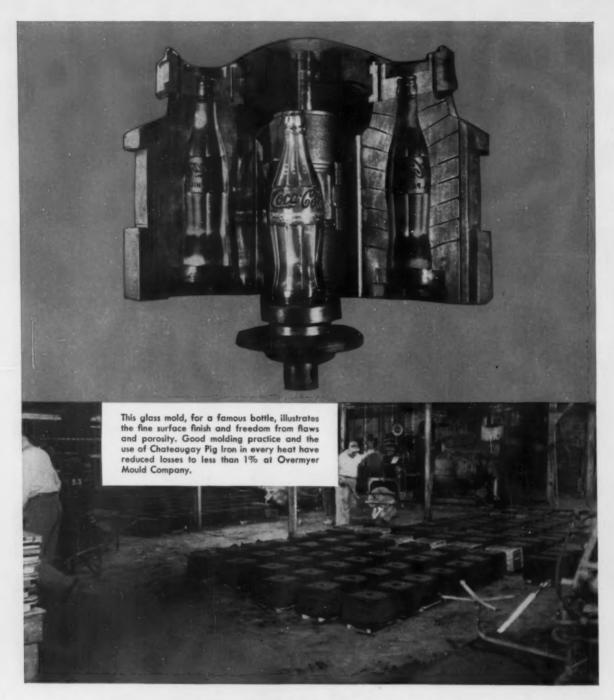


GEORGE ULLRING, appointed asst. sales manager, Allen Manufacturing Co., Hartford, Conn.



EUGENE K. KELLY, named works manager, Detroit Diesel Engine Div., General Motors Corp., Detroit.





REPUBLIC



World's Widest Range of Standard Steels

How Chateaugay Pig Iron helps glass-mold foundry cut losses to less than 1%

It takes a good pig iron to meet the rigid casting requirements of Overmyer Mould Company, Winchester, Indiana, producers of molds for manufacturers of glass containers.

The molds are machined and hand finished to obtain extremely smooth surfaces. Some molds call for a tolerance of +.002 to -.000. Therefore, the castings must be perfect from a density standpoint. The slightest flaw or evidence of porosity would cause them to be rejected. Yet, Overmyer is able to keep its loss rate under 1%.

How do they do it? By using Republic Chateaugay Pig Iron in every heat, including heats of nodular iron. The company has found through actual experience that there is no better nor more economical means for insuring flaw-free, easy-to-machine castings.

Chateaugay is a low-phosphorus, copper-free pig iron. Its highly uniform distribution of chemical elements assures a dense, fine grain structure throughout every casting, regardless of size or shape.

Overmyer's foundry superintendent points out that in addition to providing good densification, fine surface finish, heat-resistance, high strength and top machinability, use of Chateaugay results in a high carbon iron, which supplies lubricating qualities so essential in glass molds.

A Republic Pig Iron Metallurgist will be glad to show you how Chateaugay consistently outperforms other pig irons. There's no obligation. Just mail the coupon.



LESS SPACE is required for storing a wide variety of parts when you use Republic Wedge-Lock Steel Shelving. Joints are designed to grow tighter as load increases, permitting higher stacking without distortion or instability. Result is efficient use of floor space plus easy rearrangement to meet changing requirements.



LESS HAZARDOUS lifting operations are the result when the proper type of chain sling is used. Republic can furnish the proper type and accessories for all applications in alloy or high carbon steel, and wrought iron. Because each type has a specific use, we recommend talking over your requirements with a Republic Chain Engineer.



LESS COST per year of service is just one feature of Republic Materials Handling Equipment. Rugged steel construction assures long, efficient service. The complete line includes all types of boxes, skids and pallets. Republic Materials Handling Specialists will work with you in designing special units to meet your specific requirements.

STEE

and Steel Products

REPUBLIC STEEL CORPORATION Dept. C-2259 3104 East 45th Street Cleveland 27, Ohio

Please have a Pig Iron Metallurgist call. Send more information on these Republic Products.

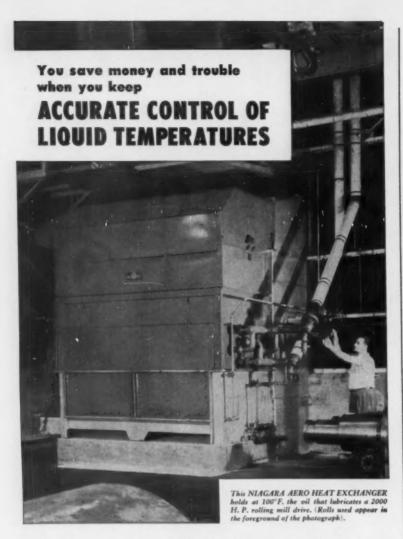
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You can cool and hold accurately the temperature of all fluids, air and gases, water, oils, solutions, chemicals for processes and coolants for mechanical and electrical equipment. You can cool welding machines, hydraulic and extrusion presses, plastic molds, furnaces, controlled atmospheres, quench baths, obtaining better results with precise temperature. You obtain closed system cooling, free from dirt or scale.

For further information, write for Bulletin No. 120

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Russell W. Knode, appointed manager, field office, Mining Div., The Jeffrey Mfg. Co., Columbus, O.; John R. Jeffrey, named export manager.

Michael Stasko, appointed assistant to project engineer, Cleveland Cap Screw Co., Cleveland.

Clarence Dykstra, named sales engineer, cranes, Detroit area, Jervis B. Webb Co.

Chester S. Johns, named sales manager, standard machines and products, The Cross Co.

Kenneth E. O'Shaughnessy, appointed factory sales representative, New England and Central New York States, The Torrington Mfg. Co., Torrington, Conn.

B. B. Flick, named lubrication engineer, sales and services, Pittsburgh Steel Mill Div., E. F. Houghton & Co., Pittsburgh.

Ernest F. Blew, named sales representative, chemical sales. Wisconsin, Minnesota and Michigan, Hooker Electrochemical Co., Niagara Falls, N. Y.

Phillip H. G. Lopatnikov, named manager, commercial research. Sales Dept., United States Steel Homes, Inc., New Albany, Ind., plant.

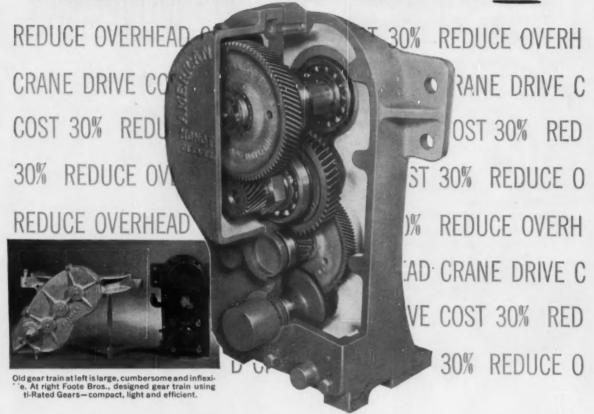
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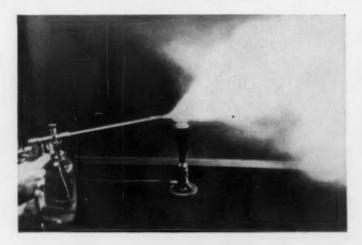
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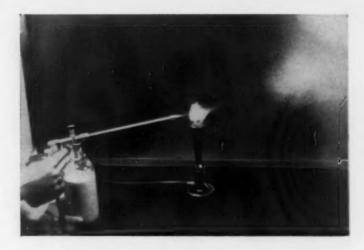
HYDRAULIC

Flame tests prove its fire-snuffing ability

This photo shows the instant combustion taking place when a conventional hydraulic oil of mineral oil type is atomized over a Bunsen burner.



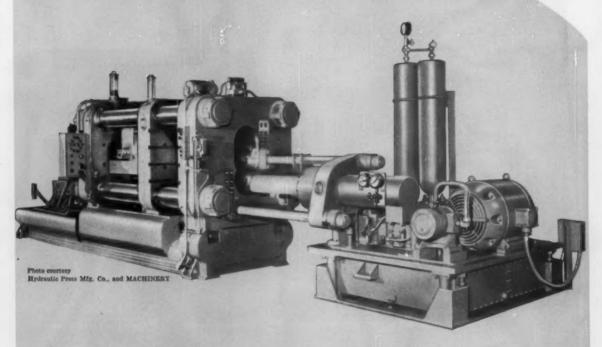
In this photo, Shell Irus Fluid 902 replaces the mineral oil. Note that there is no ignition.



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FEATURE ARTICLES

Saves costly chips—

Design Special Hoods For Machining Toxic Metals

- ◆ Many of the modern metals used in atomic energy and related programs are very costly . . . Some also produce toxic dusts . . . Machining them poses a dual problem of recovering every chip while keeping shop air pure.
- Answer in both cases is to put a tight exhaust hood over the machining area . . . Design must allow the operator good visibility, easy access to tools . . . Here's how it's done on standard lathes and milling machines.

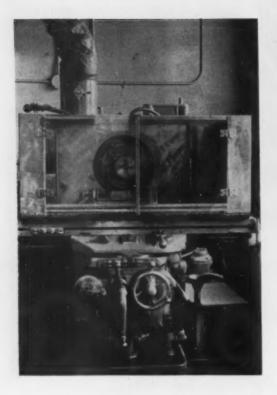
◆ VENTILATED HOODS that completely enclose workpieces and cutting tools may seem like curious accessories for standard lathes and milling machines. But they're essential in many cases where expensive and even toxic metals must be machined for atomic energy and related programs.

Consideration for the machinist is a prime factor in designing a practical hood for any machine tool. Unless the operator can work without handicaps, his efficiency and morale will be below par. Use of a respirator particularly, although sometimes necessary even with hooded machines, should be kept to a minimum.

Where extremely valuable material is being machined, loss of chips in the machine proper or in floor sweepings cannot be tolerated. Thus the hood, plus the coolant supply, must be essentially a closed system, independent of the machine tool proper.

Various types of hoods for lathes and milling

By J. M. TAUB, Group Leader, Los Alamos Scientific Laboratory, Los Alamos, N. M.



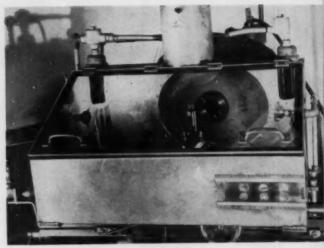


FIG. 1—(Left) Plastic and stainless hood allows three-directional travel of milling machine table.

FIG. 2—(Above-Left) Interior lights, water spray heads feature hood for rotary-table type milling machine.

FIG. 3—(Above-Right) Inner tube between hood and vertical ways serves as flexible connection.

machines are used in shops of the Los Alamos Scientific Laboratory, Los Alamos, N. M. So that tool holders, tools and workpieces can be seen as clearly as possible, hood construction features extensive use of clear plastic material. Stainless steel is also widely used to prevent rusting and facilitate hood cleaning.

In the Laboratory shops, suitable hoods had to be designed for two types of milling machine setups: (1) jobs that required the machine table to move either right or left, in or out or up and down in relation to the spindle and cutter; (2) jobs that called for a rotary table mounted on the table of the machine.

Fig. 1 shows a hood used on milling machines with three-directional table travel. Doors and top of the hood are clear plastic, and all metal parts are stainless steel. The hood is bolted to the machine table, as is the vise inside. Soft copper washers on the fastening bolts act as gaskets to prevent leakage of coolant into the table of the machine. Bed of the hood is designed to retain some coolant, which quenches hot chips as they drop from the work and tool.

Pipe shown on the top left side of the hood exhausts fine metal particles to an electric precipitation unit where they are retained and recovered. Exhaust is located at the back of the hood to pull fresh air in past the operator and remove toxic fumes without any hazard to him.

The hood as shown has a considerable opening in the rear to allow movement of the hood and table in various directions with respect to the arbor. This is not particularly desirable from the standpoint of losing chips and permitting toxic dust to escape through the opening. However, newer hood designs feature a flexible rubber enclosure between the hood and the rear of the machine. This permits hood and table movement in all directions but retains the effectiveness of a closed system.

Hood design used with the rotary table type of milling machine setup is shown in Figs. 2 and 3. It is centrally located with respect to the rotary table and is fastened to the regular machine table by two long studs at each end. Bottom of the hood has a circular hole which is slightly larger than the diameter of the rotary table. Edge of this hole is turned up to form a circumferential lip approximately 1.5 in. high.

This lip surrounding the rotary table retains

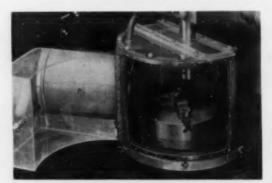
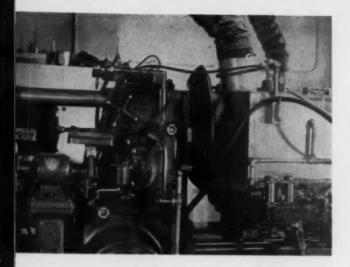


FIG. 4—Lathe hood with heavy tool holder and boring bar mounted on the compound rest.



coolant on the floor of the hood for quenching hot chips. Drain to the coolant tank may be adjusted up or down to vary this coolant level. A rubber tube connected to the coolant pump enters the hood through a small hole in the top. Exhaust end of the tube fastens inside the hood to direct coolant to the tool-workpiece interface.

Two waterproof lighting fixtures illuminate work within the hood. Two spray heads inside the hood are connected to a quick-acting valve which is outside and to the left of the hood itself. Spray heads are directed toward the work area and serve to quench any fires that might start during the machining operation. This is only a safety feature; it is not used normally.

Adjust air flow as needed

Hood for the rotary table type of machine has the exhaust duct centrally located so that it will be directly over the workpiece most of the time. A sliding panel mounted to the right on the front of the hood has six holes drilled in it, and corresponding holes are drilled in the hood itself directly behind the panel. Thus, by sliding the panel, air flow through the holes and

out the exhaust can be adjusted to meet job requirements.

The entire plastic top of this hood is hinged so that it may be swung upward to rest against the exhaust pipe. This gives the operator a maximum of free access to his work for purposes of setting up a job, taking measurements or adjusting tools.

Inner tube forms flexible coupling

Fig. 3 shows the connection between the rear of the hood and the milling machine column. A large rubber inner tube, slit on the inside radius and opened up, serves as the flexible connection to make the hood essentially a closed unit.

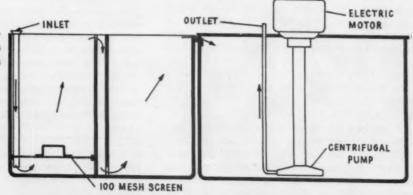
Bolts and a metal plate fasten the inner tube to the rear of the hood. Circular metal plates fastened to the vertical ways of the machine clamp the tube firmly at the machine side. This clamping arrangement may be moved up or down as required.

A lathe is one of the most difficult machine tools to hood effectively. There are numerous ways of tackling the job, ranging from hooding the entire machine to hooding only the work area. Engineers at Los Alamos prefer to enclose only the machining area for the superior control it provides in recovering all turnings and in exhausting all toxic dust.

Fig. 4 shows one of the lathe hoods in current use. Construction materials are clear plastic (for visibility) and stainless steel. The metal ring on the left side of the hood is fastened permanently to the lathe headstock. The hood proper slides under this ring and is held in place by two wing nuts. This feature permits a certain amount of flexibility in that various lengths of hoods, all fitting the same fastening ring, can be interchanged as necessary.

The hood is circular in cross section and the bottom portion is between the lathe ways. A screen-covered coolant discharge pipe, about two in. high, is welded into the bottom of the hood. This permits a two-in. deep coolant level at the center of the bottom section to quench hot chips. The screen on the discharge pipe keeps all turnings inside the hood.

FIG. 5—Complete recovery of milling chips is accomplished in this coolant filtering unit.



"Checks on shop air show that the volume of toxic dust is held below tolerable limits . . ."

Exhaust pipe for the lathe hood is attached at the top and rear of the unit directly over the chuck and the work. This position helps pull any dust away from the operator, into the exhaust system, and eventually, into the precipitation device.

Plastic door of the hood opens at a wide angle and permits maximum accessibility to the machining area. When the door is closed all operations are clearly visible.

Successful operation of a hood of this type depends on an extremely rigid tool. This was accomplished by designing a heavy, adjustable tool holder which is bolted to the compound rest of the lathe as shown. A heavy boring bar, about two in. in diam, fits into the holder. End of this bar is machined to accommodate regular cutting tools.

The boring bar fits into a hole in a sliding plastic panel on the end of the hood. Thus the tool can move in all the usual directions without hindrance. To use the tailstock of the lathe in addition to the cutting tool, the sliding panel can be modified and another hole can be cut into the plastic end panel. Boring bar shown in Fig. 4 is approximately 16 in. long and 2 in. in diam. Even when used in the fully extended position, it is rigid enough to not produce chatter marks on the work.

Tightness improves efficiency

The hood is efficient in not permitting leakage of coolant, turnings or dust. Neoprene gaskets are used to seal door openings. Because the exhaust system creates a slight negative pressure any leaks, such as around the boring bar, actually draw clean air into the unit and prevent escape of any toxic dust.

A later design of lathe hood differs from the one shown in two major respects. One is the manner of attaching the fastening ring to the headstock. The other is the hood bottom, which does not follow a true radius but blends into a rectangular box welded to the hood. This permits greater coolant depth for quenching chips and also provides more room between the collection of chips and the revolving work and chuck. The newer design gives the operator better working conditions, but in overall efficiency, both designs are on a par.

To recover all valuable chips, some modifications of existing coolant systems are required. With milling machines especially, it is not feasible to use the regular sump and pumping system because of the possibility of losing material in the rough-surfaced interior of the sump. This part of the equipment is also relatively inaccessible for cleaning purposes.

At Los Alamos, a separate coolant pumping system was designed to be entirely independent of the milling machine proper. At present, the coolant filter and pumping system are individual units (Fig. 5), although there is no particular reason why both could not be incorporated into one coolant tank.

The first unit is essentially a filtering system. Coolant overflows from the floor of the hood through a coarse filter which retains the larger chips inside the hood itself. This overflow moves down the pipe shown at the left of the sketch and emerges directly underneath a fine mesh screen. Thus practically all of the particles in the coolant are retained in the narrow space between the screen and the bottom of the tank.

Tanks cleaned regularly

The relatively clear coolant then rises to the top of the first chamber, and flows over the exhaust side which is lower than the chamber's other sides. It drops down a narrow passage and emerges at the bottom of the next chamber. Here it rises again and exhausts into the coolant sump proper which contains the circulating pump. Clean coolant is then pumped back into the hood where it is directed against the cutting tool and the work.

The tanks are cleaned at definite intervals and it is found that practically all material is caught on the fine mesh screen in the first compartment.

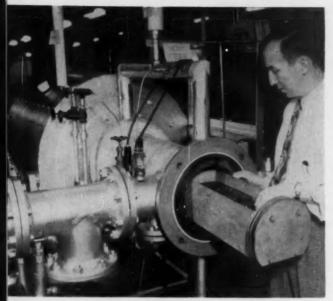
Coolant tanks are not used with the hooded lathes. On these machines the coolant drains into an exposed, smooth-surfaced pan which is cleaned easily and rapidly. It also passes through a filter in the pan before it goes to the recirculating pump.

Lathe hoods are designed so that a series of filters can be used in the coolant drain pipe. A fine mesh screen is used as the first filter in the system so that practically all of the turnings are retained in the hood. Lathes are cleaned weekly and the coolant is filtered several times before it is returned for another period of extended use.

Hoods described for both lathes and milling machines have been quite successful. Constant checks of shop atmosphere show that volume of toxic dust is well below tolerance limits. Hood efficiency is responsible for keeping overall loss of chips and dust well below 0.5 pct and approaching zero.

Operators are also satisfied with the hood designs. They are not unduly hindered in performing any precision operation that can be done on standard, unhooded machine tools. Getting good visibility has been no problem.

[■] Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.



Inside this furnace, finish machined stainless steel parts will not discolor or distort.

Finish Tiny Stainless Steel Parts, Then Heat Treat

♦ SMALL precision stainless steel parts are now being finish machined before heat treating. This is possible by a heat treating process used in the production of watch and instrument parts and midget aircraft components. Even minute stainless parts can be heat treated to any desired degree of hardness or toughness without causing discoloration. Unwanted dimensional distortion is also reported as eliminated.

This heat treating process is said to be effective for all hardenable grades of stainless steel. Allied Products Div. of Hamilton Watch Co., Lancaster, Pa., the developers, say that the desired hardness can be attained even all the way through the metal.

Overcomes repair problems

Allied's heat treatment is an outgrowth of Hamilton's development work on small stainless steel watch parts. The metal is used in many watch components, particularly fastening screws. Carbon steel screws formerly used often corroded and some times would be broken when the watch was disassembled for cleaning or repair. Removal of a broken screw is extremely difficult. Stainless steel eliminates this hazard.

In addition to heat treating watch parts, Allied is producing three tiny components of jet metering sets for use in a nozzle on jet plane engines. Some 25,000 of these are being handled each month for Air Force subcontractors. Other instrument and aircraft parts include: an actuating drum, gears, a poppet, switch actuating levers, eyelets, pinion blanks and element caps.

Hamilton inspectors aren't very tolerant with tolerances. Hence, the process has been made to closely control dimensional shrinkage and growth. Winding stems' overall lengths are 0.4500 in. Threads are up to 113 to the inch. On the cylindrical section they must be held to within ±0.0006 in. diam. Smaller screws of 0.0118 in. diam have 339 threads per inch.

Minute parts are machined and finished. Then they are heat treated. There is no need for secondary operations such as cleaning and polishing after hardening. Screws are so small that 100,000 of them are handled in one operation.

Precise preparation and control of the heat treating furnace atmosphere is credited with doing the job. Furnaces are gas tight to keep out contaminants. After purging with nitrogen, an atmosphere of dry hydrogen engulfs the parts. This is passed through a Deoxo Unit and Lectrodryer. The dew point is below -60°F. Where required, several stages are carried out, including a main heat treating step and a vacuum heat treatment. In bright hardening and tempering, dissociated ammonia with a dew point under -60°F is used. Following this a vacuum is utilized for high temperature tempering. In batch annealing a vacuum is also used. Grades of steel handled with bright hardening and tempering are: Martensitic types 403, 410, 414, 416, 420, 431, 440A, 440B and 440C. In annealing, they are: all hardenable grades and types 301. 302, 303, 304, 308, 309, 316, 321, 347, 442, and 446. All heat treating is done with equipment designed and built at the Hamilton Watch Co.

Shot Peeners Handle Larger, More Complex Parts

- Shot peening improves fatigue resistance in many parts subjected to varying tensile stresses...
 Result has been steady increase in number of plants installing peening setups, in utility of the technique ... Parts from aircraft wings to pins are peened.
- Growth of independent shot peening plants is one measure of technique's place today . . . One firm, for instance, has expanded five times in five years . . . Here are some jobs it's handling today, and some of the ways it goes about handling them.
- ◆ SHOT PEENING'S utility as a means for stepping up fatigue life of metals has won it a recognized niche a mong metallurgical techniques. Today, peeners are taking on a greater spread in size and variety of materials than ever.

Many plants set up to handle their own peening requirements. Where volume or variety or complexity of work makes this impractical, independent peeners (currently six in number) are equipped to give fast, efficient service on the overflow work. A look at one of these independents gives a pretty good cross-sectional view of shot peening's present-day capabilities.

Take Aeronautical Service Engineering, an

Albertson, L. I., N. Y. firm which has expanded five time in five years to keep in step with customer requirements.

Equipment additions have played an important part in these expansions. Basic facilities needed for peening are well known, and ASE has furnished its shops with all types and sizes. These have included everything from small cabinets for small pieces and quantities to large Rotoblast tables for handling work in production quantities.

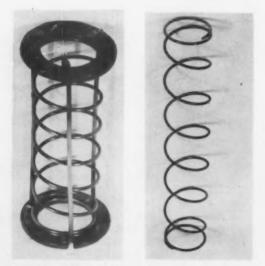
Special features added

To this equipment, the company has added a number of special additional features. These help considerably in handling the many kinds of work coming in from all over the country.

Stress peening, for instance, is one important service provided customers. One job calls for subjecting a section of an aluminum aircraft wing, distorted by machining, to double peening treatment. First both sides of the section are given a 100 pct peening to eliminate machining stresses. Then the section is locked in a jig and peened again, so it conforms to the jig or template within 0.010 in.

Special tooling, jigs and fixtures play an important role in peening, since a wide variety of sizes and shapes—interiors as well as exteriors of parts—must be handled. The angle of impingement of shot striking the work is critical, and may vary from 90° to 45°.

ASE has designed many special jigs to peen such irregular surfaces. An example is a shaft with a bell housing machined integrally with it. The trick here was to construct a traveling jig so that the stream of shot would hit the curved or bell part of the shaft at the same angle as the straight part. An accompanying photograph



STRESS-PEENING this critically-loaded spring under partial load conditions increased its resistance to fatigue failure, permanent set.



SPECIAL, variable speed drive on this Rotoblast equipment permits close control over speed of rotation of shot-throwing wheel; hence over force (a critical factor) with which shot strikes work.

shows such a setup for shot peening shafts on a production basis.

One particularly difficult-to-design device was built to permit shot peening the interior of hollow shafts. This was managed through an arrangment of a special Pangborn airblast cabinet, a long steel tube connected to the air source, and flexible coupling.

A special shot blast separator was another development. This was made because shot size, uniformity and freedom from degradation are of such paramount importance in getting maximum results from shot peening.

The company uses large quantities of shot in many sizes. Not satisfied with commercially available separators, it built its own unit. This separates one size of shot from another as well as eliminating broken shot.

A high percentage of work calls for differential shot peening. Often only a part of a hub gear or shaft will require peening, and other areas must be masked off. On short runs, such masking is improvised and applied manually to

each piece. Masks of rubber, plastic, canvas and other materials are built for longer-run work.

Many new materials come in for peening. Although steel was the first metal to be shot peened, and is still an important factor, stainless steel, aluminum, magnesium, brass, beryllium copper alloys and titanium are also handled. Titanium is possibly the most spectacular metal handled. In some forms, it glows during peening.

Some customers adopt peening as a useful maintenance or overhaul procedure.

Airplane propeller hubs are a for-instance. Some of these are returned at regular overhaul periods for shot peening of a particular area which is stressed during operation. Shot peening makes it possible to return these parts to service.

Despite the strides made over the last several decades, ASE feels that shot peening is not being used correctly today in many cases. Instead of designing parts to make the most of shot peening's capabilities, peening is used merely to provide an extra safety factor or, in extreme cases, as a last resort to reduce failures.

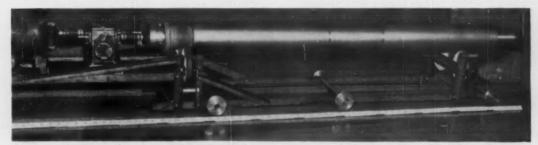
In fact, they, can catalog instances in which one part in a machine has been shot peened to increase strength, only to cause failure in another integrated part. Finally, all structural parts of the assembly were shot peened.

Adds 2 pct to cost

Costs have been a matter of prime interest to ASE since most of its work is done on contract. Their experience has been that shot peening adds about 2 pct, on the average, to the cost of a part peened in volume. Cost runs higher proportionately on shorter runs.

And what of peening's prospects for the future? They're bright, ASE believes. The process already allows designers to use cheaper materials in some instances, like substituting brass for stainless on particular applications. Also, peening should permit parts, correctly designed, to be lighter in weight and smaller.

Improved peening techniques should further lower costs. The company thinks one such logical development would be the integrating of shot peening as a part of automated machining.

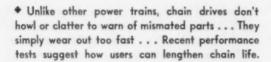


SPECIAL JIGS ensure that irregular work surfaces will get a uniform peening at the same angle.

Setup shown is typical one for shot peening shafts on a production basis.

Dynamic Checks Point Way To Longer Chain Life

By W. F. HOFMEISTER, Chief Metallurgist, and H. KLAUCKE, Chief Engineer, Roller Chain Div., Chain Belt Co., Milwaukee



♦ ROLLER CHAINS have an internal flexibility which makes them an ideal means for transmitting power in many applications. Yet their flexibility is a drawback in another way—serving often to disguise internal troubles which may exist if the drive has been improperly built or maintained.

Net effect has been to prevent chain drive users from "playing it by ear" to detect such troubles. Where other means of transmitting power will howl, clatter, or otherwise audibly complain of mismated parts, chain drives suffer in relative silence. Often, the only indication of such difficulties is shortened chain life and too-frequent maintenance.

Chain drive manufacturers have learned a lot recently about the factors affecting dynamic operating performance, using strain gage transducers as investigative tools.

This article discusses how Chain Belt Co. has applied these test techniques in tackling the problem of getting longer drive life.

To begin with, there are three sources of load pulsations introduced in any power train. Two of these—power pulses introduced by the motor or other prime mover and demand variations in the driven load—we can dismiss immediately. The first is the concern of the engine manufacturer; the second can be minimized by proper

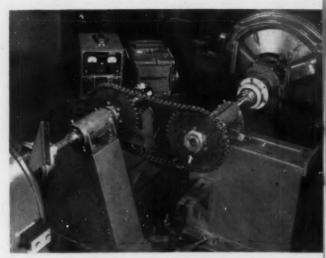


FIG. 1—Test measurements under dynamic load were made with the 60 hp GE dynamometer setup. A strain gage torque bridge measures chain tension under varying eccentricity conditions.

• Effects of chordal action, sprocket eccentricity, non-uniform pitch were charted . . . Documented results point up importance of precision manufacture, careful chain maintenance.

design and operation of the machinery.

Item three, though—load variations set up in the transmission system itself—is of prime importance, both to chain manufacturers and to maintenance staffs in user plants. These life-shortening variations can be caused either by the system's inherent characteristics or by dimensional differences. These part-to-part differences can exist while the chain still falls within manufacturing tolerances.

Breaking item three down further, there are again three sources of chain tension variations introduced within a chain drive.

First of these is chordal action. This results from the fact that sprockets are not true circles, but finite polygons. Thus the tangential velocity of the chain varies from a minimum when the round parts of the link are just seating to a maximum when they are furthest out on the pitch circle.

Effects of chordal action on tangential chain tension are most severe on sprockets with small numbers of teeth. They become greatly reduced on sprockets with more than 20 teeth. Fig. 2 shows such chordal action variations.

Eccentricity between the bore of the sprocket and the pitch circle or, less frequently, a bent shaft, is a second source. It can cause large chain tension variations to be superimposed on those variations attributable to the prime mover and 'the working load.

Result can be peak tensions imposed on the chain and on the associated machinery which are well in excess of the tension calculated on the basis of the horsepower available. Thus it is possible for a chain to be 100 pct overloaded while operating on a drive properly calculated with respect to horsepower requirements, but having sprockets manufactured outside ASA tolerances.

The oscillograph records of dynamic chain loading in Fig. 2 show clearly why sprockets must be manufactured with a precision equal to that used in the manufacture of the chain itself.

Third source of internal chain tension variations is non-uniform pitch over relatively long sections of chain (i.e., the length of chain between sprockets). If the center distance is 2 ft, for example, then each foot progression of pitches must be the same total length or tension variations result.

Dynamic load measurements were made with the G-E 60 hp dynamometer setup shown in Fig. 1. The arrangement was one used in a series of tests in which effects of both sprocket eccentricity and chain pitch variations were studied.

In making the tests, eccentricity was varied through an adjustable eccentric bore on a plate sprocket. Chain tension was measured by a strain gage torque bridge located on the shaft, gage leads passing through the shaft and connecting to a Baldwin slip ring. A Hathaway MRC-16B control unit and S14-A oscillograph were used to record the signals.

Fig. 2 shows why it is poor practice to couple a section of new chain into a worn chain strand. The oscillogram at top was made by coupling the chains of six different manufacturers together. The resulting pitch variation produces a large load fluctuation which repeats for each travel of a given link once around the chain circuit. Pitch of each of the six sections was uniform within itself, but present ASA specifications allow a variation in chain length of 1/64 in. per ft of chain -0.13 pct. As the charts show, even these minor pitch differences mount up.

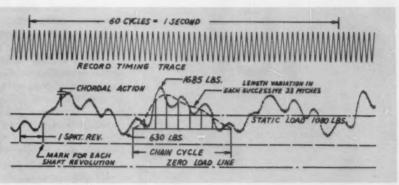
Replacing damaged links individually is all right. This causes no harmful load variations, because the percentage change in length introduced by this single link while in the tight strand is too small to matter.

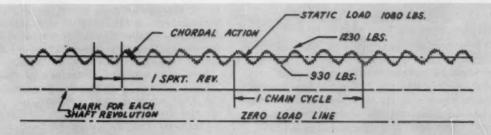
To double-check that the low frequency, large magnitude load variations observed on the oscillogram were actually caused by pitch variations, the pitch of each link in the entire strand was measured. Measurements were made roller-to-roller with a special gage accurate to within 0.0001 in. Length of each successive 33 pitches was obtained by summing the measured link pitches.

These data were then plotted and scaled against the load variation trace on the oscillogram, the identical shapes obtained serving to confirm the relationship.

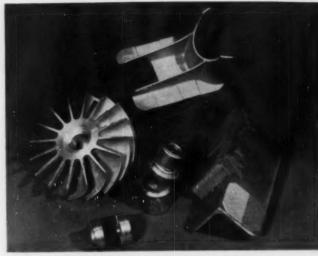
The bottom oscillogram (Fig. 2) was made with the same setup, except that the composite chain was replaced with one of all one manufacture. Note that the load variation due to pitch differences has been eliminated, and only those variations due to sprocket eccentricity and chordal action remain.

FIG. 2—Oscillograms show clearly why new chain sections should not be coupled into worn chain strands. Large load variations introduced by pitch differences with composite chain (top) are not present with chain of all one manufacture.





Mate Processes For Better Casting Quality



ASSORTMENT of castings shown demonstrates versatility of the process. Note thick sections, intricate configuration, cast-in steel inserts and reproduction of fine detail.

- Selectively mate two proved foundry processes like permanent mold, centrifugal casting... Then blend in today's special foundry techniques and latest mold design developments... Result: aircraftquality castings—at less cost.
- ◆ Take the parts turned out by Northrup Aircraft
 . . . Resultant castings possess excellent physical
 properties, surface finish of 100 RMS or better . . .
 Need for machining? It's been all but eliminated.
- ◆ PRODUCING castings on a competitive-cost basis is a problem all founders face. But it's particularly acute where "competitive cost" must be balanced off against the need for meeting precision-quality requirements.

One highly useful approach for aluminum founders combines the best features of permanent-mold and centrifugal casting techniques. Parts are cast in permanent metal molds as in centrifuging, that is, with the part spinning about an axis which does not pass through the part itself. The centrifugal force developed drives the molten metal tightly into the casting cavity in the mold.

Resultant castings are excellent. Castings show higher physical properties than with previous methods. Tolerances are closer and very good surface finishes—rms 100 or better—are obtained.

At the same time, the method offers distinct cost advantages over permanent-mold casting alone. This is due in large part to elimination of the need for machining.

The method is used in producing a variety of work for Northrop Aircraft and for several other companies. Production castings have passed all X-ray and fluorescent-penetrant inspections without detectable flaws. Other metallurgical checks have shown that a fine and uniform grain structure is achieved.

Thus far, the method is used only for casting aluminum parts. Materials cast include such general purpose aluminum alloys as 356. Other permanent-mold alloys have been cast. Typical properties in the range of 50,000 psi ultimate tensile strength, 40,000 psi yield strength, and 7 pct elongation have been obtained in separately cast test bars. Development of magnesium casting techniques looks promising. Thus far, no magnesium has been used for aircraft work, however.

Molds used are like those of permanent mold casting. Improved mold design and mold surface-finish specifications allow tolerances, part-surface finish and parting line mismatch to be closely controlled.

Hinge-type molds simplify the operation. These not only permit closer tolerances and better mating, but also prevent stressing of the part during its removal from the mold.

Steel cores are used. These can be either of the collapsible or the solid metal variety although the latter are preferred. Precision sand cores are also used.

Maximum size of casting produced by the

Producibility Cost Summary of a Casting

		JGAL CASTING		CONVENTIONAL PERMANENT MOLD	
		Amortized	Total	Amortized	Total
Die and tool cost	4	.07	\$1,455.00	.05	\$1,066.00
Cost per piece		1.44		.47	
Machining		.51		5.56	
Total cost-piece		2.02		6.08	
Contract cost		\$42,420.00		\$127,680.00	
	\$ 127,680.00				
	-42,420.00				
Savings	+85,260.00	ing Process	ent Mold—Centrifugal Cast	Using Perman	

Quantity based on 42/plane, 500 airplanes

method with equipment now available is about a 70-in. length. Weight reductions realized on such larger castings are substantial. This is true because the higher pressures exerted by centrifugal force on the molten metal permit reduced section thicknesses, as well as a soundness of casting which the company feels is not obtainable generally with techniques previously employed.

Good tolerances are obtained. Dimensional accuracy is ± 0.010 in. in 5 in. Angularity is ± 30 minutes. Flatness is 0.010 in 10 in. of length. Contoured surfaces are 0.015 in. in 10 in. Minimum diameter for cored holes is $\frac{1}{8}$ in. Recommended draft angle is 2° maximum. Recommended minimum fillet and corner radii are 0.010 in. On small webs, section thicknesses may be as low as 0.07 in.

Good surface finish

Surface finish is easily held at rms 100, with rms 60 possible on smaller sections.

The fact that surface finish is better than that of permanent molding is a major advantage. Rough surfaces give castings lower elongation, ultimate strength and yield values, due to the multiple cavities in the skin perpendicular to the lines of stress. Test samples pulled from castings varying in surface roughness tend to prove that part strength is in inverse proportion to the surface roughness of the casting.

Experience shows that where quantity requirements warrant the process is the most economical available for producing high quality castings with a minimum rate of rejection.



BREAKING the mold for casting removal. Note the unique construction utilized. Mold whirls on this table, while foundryman pours in aluminum from hand ladle. Use of such hinge-type molds not only permits closer tolerances and better mating, but also prevents stressing of the part during its removal from the mold. Either steel or precision sand cores can be used.

How Boron, Grain Size Affect Impact Properties

- Along with carbon and alloy content, both boron additions and grain size have important effect on the impact strength of low alloy steels. Another significant factor is the ratio that may exist between molybdenum and phosphorus contents.
- Boron addition to low alloy steels at high strength levels appears to have great practical significance. It could mean still higher strength steels without sacrifice of toughness—a prime contribution to current aircraft needs.

By H. SCHWARTZBART, Supervisor, Welding Research, and J. P. SHEEHAN, Supervisor, Applied Metallurgy Research, Armour Research Foundation of Illinois, Institute of Technology, Chicago.

PART II

♦ AS METALLURGICAL topics go, the subject of brittle fracture is extremely important largely because this type of fracture is so unfortunately commonplace. Heat treated, low alloy steels—despite other engineering advantages—are certainly not immune to this type of failure.

The effects of carbon and alloy content, especially nickel and molybdenum, on embrittlement and overall impact properties are of prime importance. Molybdenum, in particular, has been shown to provide a beneficial effect in promoting low transition temperatures by offsetting the embrittling effect of phosphorus.

By logical extension, the role of phosphorus alone, as well as the effect of the molybdenum to phosphorus ratio on transition temperature, is necessarily basic. The effect of Mo/P ratio on transition temperature for a variety of 0.40 pct C alloy steels in the quenched and tempered condition has been analyzed. In Table I are listed the steels investigated. Transition temperatures read at 80 pct of the maximum energy are plotted against hardness in Fig. 1. The open points represent Mo/P ratios of 5.1 and more; the closed points, 5.0 and less.

How Mo/P ratio works

A line divides the various steels into two divisions. There are those having Mo/P ratios greater than 5 whose transition temperatures are relatively low. On the other hand, there are those having Mo/P ratios less than 5 whose transition temperatures are relatively high. Thus, the effect of Mo/P ratio is exerted at all hardness levels.

The effect of the Mo/P ratio is further shown in Fig. 2 where the deviation from the line in Fig. 1 is plotted against Mo/P ratio. In the eight grades represented, the transitions were determined at seven hardness levels for each heat.

For these heats, average values of deviation were used in Fig. 2. These are indicated by

Second of a three-part series, this article is based on one of the most comprehensive programs on the impact properties of low alloy steels ever conducted. The first article of this series (Iron Age, August 9) reviewed the effects of carbon and alloy contents on impact strength. The concluding installment will appear in the August 23 issue. Watch for it. It's important.

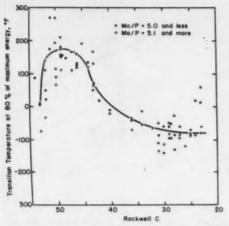


FIG. 1—Effect of Mo/P ratio on transition temperature of 0.40 pct C tempered martensites.

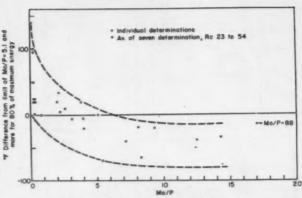


FIG. 2—Deviation from limit line plotted against Mo/P ratio. Broken line shows trend.

closed points. Heats for which the transition temperature was determined at only one hardness are indicated by open points. Fig. 2 indicates that a large effect is exerted on the transition temperature as the Mo/P ratio is increased to about 5, but that the effect of the ratio is less potent as it is increased above 5.

The effect of phosphorus content on the impact properties of two grades of steel at three carbon levels is shown in Fig. 3. The two grades investigated were 4100 and 5100. The latter is the same as 4100 except that it does not contain molybdenum. The low phosphorus heats contained from 0.014 to 0.023 pct phosphorus. High phosphorus heats (signified by the letter "P") contained from 0.031 to 0.037 pct phosphorus.

Added phosphorus is harmful

The added phosphorus has a deleterious effect on the transition temperature in every case except for 4180. Also, the transition temperature is elevated more for the steel containing no molybdenum, 5100, than for the steel containing molybdenum. Molybdenum offsets the deleterious effect of phosphorus to a large extent.

Boron has achieved importance as an alloying addition to steel. Its function is to increase hardenability in place of other alloying elements. Part of the present program was devoted to a study of the effect of boron on impact properties.

Previously it was found that boron may have a beneficial or an adverse effect on impact properties, depending upon the hardness level and structure. The effect of boron on temper brittleness had not definitely been determined.

Two aspects of the effect of boron were studied. (1) The determination of the effect of boron on the variation of transition temperature with tempering temperature, and (2) the effect of boron on temper brittleness. Two grades of steel, 2345 and 8120, were studied at four levels of boron content.

The effect of boron on the variation of impact properties and hardness with tempering temperature is shown in Fig. 4. Both 2345 and 8120 exhibit the familiar A-brittleness, or "500°F embrittlement." The 2345 grade exhibits B-brittleness, or the "1200°F reversal" at the two lowest boron levels.

Although boron has little effect on the variation of hardness and maximum energy with tempering temperature, it has a marked effect on the variation of transition temperature with tempering temperature. Boron affects both A-and B-brittleness.

Its effect on A-brittleness is two-fold. For one, the amount of A-brittleness is decreased. Secondly, the maximum occurs at a higher tempering temperature.

The net result of the effect of boron on A-brittleness is that steels at high strength levels benefit greatly from boron additions as regards transition temperature. This benefit is of great practical significance in view of the fact that the aircraft industry in particular requires higher strength steels without sacrifice of toughness.

Boron affects brittleness

To investigate the effect of boron on temper brittleness, specimens were either quenched or furnace cooled from a temperature of 1150°F. The results are shown in Figs. 5 and 6 as functions of boron added.

For both 2345 and 8120, the hardness is practically unaffected by the boron additions. For 2345, the slowly cooled specimens exhibit a slight maximum in transition temperature as boron is increased. The transition temperatures of the quenched specimens decrease 150°F as the boron is increased from 0 pct to 0.004 pct. This is a

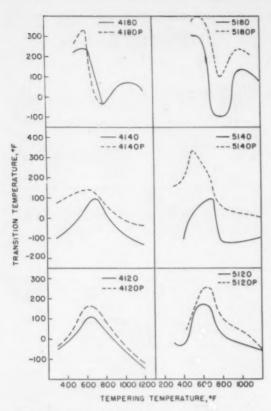


FIG. 3—Effect of phosphorus on transition temperatures for 4100 and 5100 series.

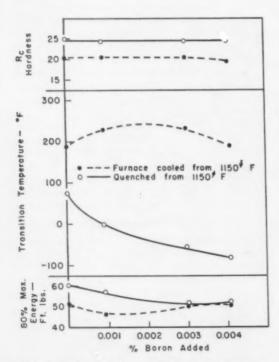


FIG. 5—Effect of boron on 2345 slow cooled and quenched from tempering temperature of 1150°F.

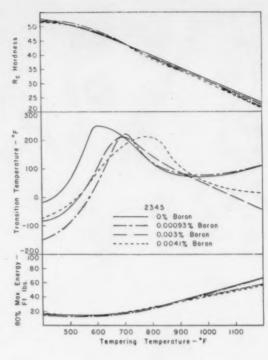


FIG. 4—Hardness, transition temp., and 80 pct max. energy as functions of tempering temp., etc.

striking confirmation of the effect that the addition of boron eliminates the 1200°F reversal, or B-brittleness from 2345.

The results for 8120 (Fig. 6) demonstrate only a small effect of boron on the transition temperature of specimens quenched from 1150°F and an increase of about 50°F in transition temperature for slowly cooled speciments as the boron is increased to 0.005 pct.

The addition of rare earth elements to steel has been a lively topic during the past few years. The entire mechanism by which such additions affect the properties of ferrous materials is not known. How rare earth additions in the form of misch metal affect impact properties was the subject of a previous article (The Iron Age, May 26, 1955).

Rare earths double energy

For this reason, the effects of rare earth additions together with the effects of sulphur or nitrogen in the functioning of these additions may be briefly summarized.

Maximum impact energy of transverse specimens was seriously reduced by increasing the sulphur content of the steel from 0.020 to 0.038 pct. The addition of rare earths doubled the maximum energy at both the 0.020 and 0.038 pct sulphur levels. No effect of sulphur or rare

Table I

STEELS ANALYZED FOR EFFECT OF Mo/P RATIO ON TRANSITION TEMPERATURE

Heat	Grade	p(a)	Me ^(b)	Mo/P(c)	Range of Tempering Temperature °F
A	1340	0.019	trace	0.3	400-1200
В	3146	0.017	trace	0.3	400-1200
G	2340	0.019	trace	0.3	400-1200
H	5140	0.019	0.04	2.1	409-1200
F	8640	0.026	0.21	8.1	400-1200
C	4140	0.017	0.21	12.4	400-1200
D	4640	0.016	0.20	12.5	400-1200
E	4246	0.014	0.20	14.3	400-1200
2308 ^(d)	5140	0.017		0.3	1150
2316	5140	0.020	0.005	0.2	1150
2321	5140	0.027	0.006	0.2	1150
2328	5140	0.039	0.006	0.2	1150
2332	Mo-Cr	0.023	0.05	2.2	1150
2580	Mo-Cr	0.025	0.010	4.0	1150
2336	Mo-Cr	0.024	0.13	5.4	1150
2337	Mo-Cr	0.023	0.19	8.3	1150
2588	Mo-Cr	0.030	0.10	2.6	1150
2693	Mo-Cr	0.040	0.15	3.8	1180
2792	1340	0.008	0.006	0.8	1150
2063	1340	0.024	0.004	0.2	1100
2703	1340	0.029	0.003	0.1	1150
2731	1340	0.042	800.0	0.2	1150
2861	Mo-Mn	0.026	0.05	2.0	1150
2895	Mo-Mn	0.025	0.10	4.0	1150
2777	Mo-Mn	0.025	0.18	7.2	1150
2872	Mo-Mn	0.036	0.11	3.1	1100
2780	Mo-Mn	0.035	0.18	5.1	1150
2796	Me	0.004	0.35	87.5	1156
2782	Mo	0.030	0.28	9.3	115

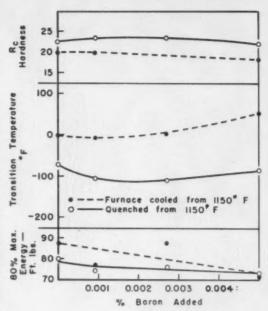


FIG. 6—Effect of boron on 8120 slow cooled and quenched from tempering temperature of 1150°F.

⁽a) Heats A through 2308, courtesy of Inland Steel Co.: Heats 2316 through 2762, courtesy of Climax Molybdenum Corp. (b) Heats 2316 through 2762, courtesy of Climax Molybdenum Corp. (c) Where Me was not determined or "trace" is shown in analysis, 0.005% Me was assumed in calculating the Me/P ratio. (d) 460 ib induction furnace inget.

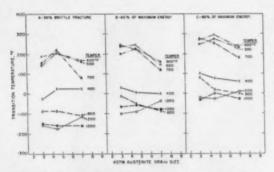


FIG. 7—The effect of austensite grain size on the transition temperatures of 2340 steel.

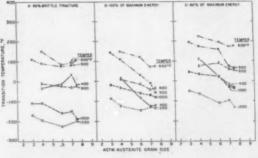


FIG. 8—The effect of austenite grain size on the transition temperature of 4140 steel.

earths on transition temperature based on a fracture criterion of 90 pct brittle fracture was noted.

Transition temperature increased 50-100°F due to an increase in nitrogen content from 0.006 to about 0.030 pct. The most serious effects occurred when the steel was tempered in the range of 500-800°F. No effect of nitrogen was noted at high tempering temperatures. The addition of 2½ lb/ton of rare earths to the high nitrogen steel restored the loss of notch toughness, but had no effects on the low nitrogen steel.

The effect of austenite grain size on the tran-

sition temperature of quenched and tempered steels was also studied. Results obtained are presented in Figs. 7 and 8. Two grades of steel, 2340 and 4140 were investigated.

The 2340 was a laboratory heat made by coarse grained practice (not aluminum killed) and the 4140 was a commercial heat made by normal fine grained practice. Austenitizing was for 30 minutes, tempering for one hour, and the structure was tempered martensite throughout the specimen. All specimens were water quenched after tempering.

The results for 4140 (Fig. 8) indicate decreas-

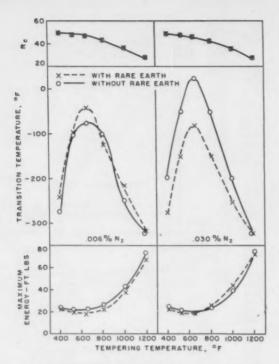


FIG. 9—Effect of rare earth additions and N_2 on longitudinal impact and hardness of 4330.

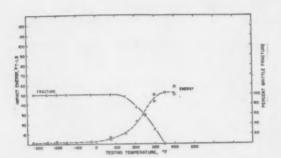


FIG. 10—V-notch Charpy impact results for spheroidite from pearlite. Hardness R_b 92.

ing transition temperature with decreasing grain size. The 60 and 80 pct of maximum energy show the greatest dependence of transition temperature on grain size at temperatures of 400-500°F—the highest strength levels investigated.

According to Fig. 7, 2340 appears to exhibit behavior similar to 4140, though there are differences for the samples tempered at 1000 or 1200°F. The transition temperature of 2340 tempered at 1000°F is not much affected by grain size. Samples tempered at 1200°F exhibit a decreasing transition temperature with increasing grain size.

To determine the effect of grain size on impact properties, the ferritic grain size and shape that is established by the tempering of martensite as well as prior austenitic grain size must be considered. In this investigation it was proposed to compare, by determining the impact transition temperature, spherodites having similar carbide particle size and spacing but obtained in such a manner that their ferrite grain structures would be different.

Ferrite grain counts

A laboratory heat of 0.80 pct C and 1 pct Ni was utilized. Heat treatment consisted of austenitizing at 1550°F, and then either quenching in oil or giving an interrupted quench in lead at 900°F for three minutes and then into oil. The former treatment produced martensite; the latter pearlite. These treatments were followed by tempering at 1050°F for the period required to produce a hardness of about 93 Rockwell B.

The two structures obtained were similar in regard to carbide size and distribution and were different only in regard to ferrite grain size and shape. In the spheroidite prepared from pearlite there were relatively few ferrite grain boundaries. The average distance between carbides and the average uninterrupted ferrite path were practically identical. Because of the finer grain size of the spheroidite prepared from martensite, the average uninterrupted ferrite path was a little shorter than the average distance between carbides.

The average ferrite grain diameter of the spheroidite obtained from pearlite was nearly three times as large as that obtained from martensite.

Energy values studied

The energy values obtained in notched bar impact tests of the spheroidites with the two ferrite grain structures are plotted against testing temperature in Figs. 9 and 10. Macroscopic evaluations of the percentage of brittle fracture are also plotted. It is evident that by any of the criteria used, the transition temperature of the spheroidite formed from pearlite is considerably higher than that of the spheroidite formed from martensite.

Using the temperatures of zero pct or 90 pct brittle fracture as the criterion, there is a difference in transition temperature between the two spheroidites of about 200°F. Using the 80 pct of maximum energy criterion, the difference in transition temperatures is about 100°F. In any case, the transition temperatures differ quite appreciably which can be attributed to the difference in ferritic grain size and shape.

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Rust prevention

Rust Preventive selector chart assists metal working firms in the selection of a suitable rust preventive to meet storage and shipping requirements for spare parts, tools. and machines. Chart deals with protective properties of a group of Nox-Rust products and physical properties and coverage afforded by each. Daubert Chemical Co.

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Pump bulletin

Information on a complete line of cradle-mounted centrifugal pumps is contained in a new bulletin. Pumps have capacities of from five to 2800 gpm and pressures of 10 to 525 ft total head. A concise tabulation of pump types with their rating is included. Cross-section view points-up design features. Various models are described and applications listed. Two pages describe modifications. Ingersoll-Rand Co. For free copy circle No. 3 on postcard, p. 113

Welding helmets

Welding helmets and equipment are described in a recently prepared bulletin. Several types are available, including a combination welding helmet and skullgard and a nitrometer mask for protection from chemicals. Mine Safety Appliances Co.

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FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 113.

Mass spectrometers

Sixteen pages, plus slipsheets, tell of two types of mass spectrometers. These, booklet says, can be used for continuous or individual sample analysis. It describes them as outstanding for complete analyses or when used as monitors for one or more components. Exceptionally high sensitivity makes them useful for purity studies, it says. Printed matter is fully illustrated. Consolidated Electrodynamics Corp.

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Roll grinder

Firm's Roll Grinders are described in a 26 page catalog. Models are available in 36, 44, 50 and 60 in. swing and center length from 10 to 24 ft. It can grind rolls from 45 to 82½ ton depending on machine size. Catalog includes 32 pictures, complete description of machine, specifications, standard and extra equipment. Landis Tool Co.

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Control valves

Describing firm's new control valves, a new brochure presents them as versatile, dependable safe controls for air operation to 250 psi. Literature pictures company's double solenoid valve, single solenoid valve and master valve. It gives a text run-down on valves' long life, efficient operation, compactness, safety and versatility. Hanna Engineering Works.

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Bolt joint tightener

A device that automatically controls tightening of bolted connections and permits accurate preloading to as high as 80 pct of bolt yield strength is described in a 12-page catalog just published. Standard Pressed Steel Co.

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Instrument panels

Now power and process plants can choose instrument and control panels to meet their individual specifications from six standard designs. Completely tubed and wired, ready to "plug-in" on arrival, these panels and their accessory equipment are illustrated and described in the new 16 page product specification. Bailey Meter Co.

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Interlocked armor cable

Interlocked armor cable is reviewed in an 18 page booklet. It covers cable system's components, advantages, product information, terminations and installation. Advantages given include: lower cost, reduced material handling, reduced space requirements, installation ease and less installation cost. Wire & Cable Dept., General Electric Co.

Hose, fittings catalog

A new condensed industrial catalog listing hose, fittings, socketless kits, and self-sealing couplings, has been released. It contains information on company's standard industrial products and is designed primarily for use in the replacement field. Aeroquip Corp.

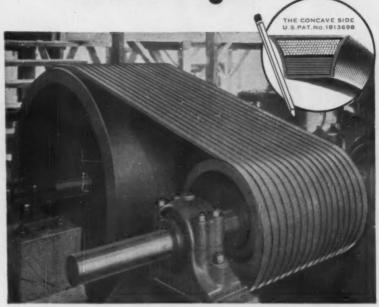
For free copy circle No. 11 on postcard, p. 113

Wire rope endings

Colorful folder describes wire ropa endings. According to the literature, this is a modern wire rope ending with a thimble or loop. It is double-locked for strength and security; safer to use because the endings will not pull out; safer to handle because the wire ends are permanently anchored under steel collars. Wire Rope Sling Dept., American Chain & Cable Co., Inc.

For free copy circle No. 12 on postcard, p. 113

Why a V-Belt with CONCAVE SIDES wears longer



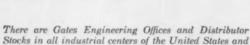
It is easy to demonstrate to yourself why the concave sides (Fig. 1) of the Gates belt greatly lengthen belt life.

Simply bend a Gates belt and feel the sides. Notice how these precisely engineered concave sides fill out on the bend and become straight. Thus a Gates belt grips the sheave groove evenly (Fig. 1-A) and wear is distributed uniformly across each side of the belt. That means longer belt life; lower costs.

Make the same test with a straight-sided belt (Fig. 2) and see what happens. The sides bulge out on the bend (Fig. 2-A) concentrating the wear at points shown by arrows.

To assure longer wear and keep belt costs down, specify the V-belt with Concave sides—Gates Vulco Rope... readily available from nearby distributor stocks. The Gates Rubber Company, Denver, Colorado—World's Largest Maker of V-Belts.





Canada, and in 70 other countries throughout the world.



Gates VULCO Drives



Used in comparatively small quantities, Foote fluxes and alloying agents impart properties that not only improve the quality, but increase the workability of many types of steel. These diversified Foote products range from ferro alloys to such specialized additives as Rimex® for rimming steels . . . Manganese Sulphide for free-machining steels . . . and Electromanganese® (99.9% pure manganese), widely used in the manufacture of stainless and alloy steels, as well as special resulphurized free-machining steels.

In production, research and technical service... Foote maintains leadership in the supply of fluxes and alloys for the steel industry as well as raw materials used in the manufacture of welding rod coatings.

Descriptive literature on any of the products mentioned will be sent upon request.



FOOTE MINERAL COMPANY

438 Eighteen West Chelten Building, Philadelphia 44, Pa.

RESEARCH LABORATORIES: Berwyn, Pa.
PLANTS: Exten, Pa.; Kings Mountain, N.C.;
Knoxville, Tenn.; Sunbright, Va.

FREE TECHNICAL LITERATURE

Nickel undercoating

Ten page technical paper describes new compressively stressed nickel plating process developed specifically as an undercoating to counteract rhodium electroplate's inherent high stress characteristics. Literature says it utilizes only one additional agent with all other operating conditions being identical to conventional nickel plating. It treats such subjects as: composition, operating conditions, make-up, control, analysis, properties and how to gauge agent's consumption rate. Sel-Rex Precious Metals, Inc. For free copy circle No. 13 on postcard, p. 113

Oilite materials

Revised engineering manual includes data on properties of Oilite materials. It lists Brinell and Rockwell ratings for these materials. Book contains new and more complete descriptions of its industrial applications. The 52-page manual contains a special 12 page insert which lists over 1000 standard sleeve, flange and thrust bearings, cored, solid bar and plate stock, available for shipment in any quantity. Amplex Div., Chrysler Corp. For free copy circle No. 14 on postcard, p. 113

Parts balancing

A "new concept" of in place analysis and correction of unbalance is described in a 12 page bulletin. It details features and operating principles of a vibrodyne balancer, a portable unit with a standard tunable pickup which can be used for balancing parts or assemblies operating between 225 and 3600 rpm. Typical applications are illustrated and case histories presented. Tinius Olsen Testing Machine Co.

For free copy circle No. 15 on postcard, p. 113

Dust collector

New bulletin on a recently developed multiple tube dust collector has been issued. Booklet says collector operates on centrifugal collection principles and incorporates new design features to boost collection efficiency and gas handling capacity. It explains operation and construction. Research-Cottrell, Inc. For free copy circle No. 16 on postcard, p. 113

AETNA-STANDARD

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This name plate represents progressive engineering and patented features...a mark of leadership as exemplified by quality, reliability and accuracy.

The patented Aetna-Standard Sheet Classifier sorts and piles sheets at high speeds automatically, selecting by gauge, surface and pinholes.

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Most classifiers the world over carry this name plate, a symbol of Aetna's leadership in designing and building of equipment. The Classifier is used on many types of processing lines for the classification of electrolytic tin plate, black plate, cold reduced sheets and aluminum sheet products.

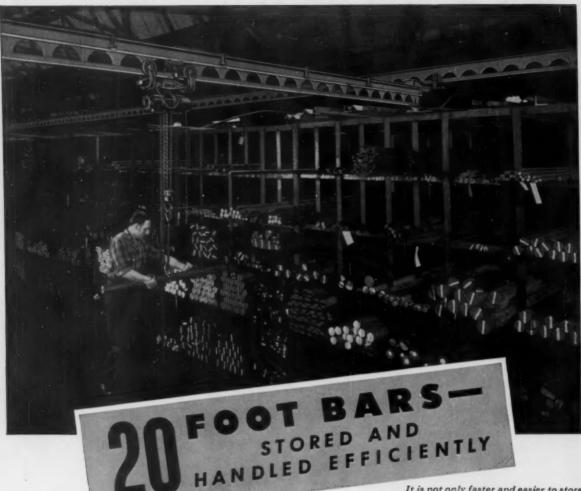
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It is not only faster and easier to store and handle stock this way, but safety is greatly improved.

WITH a simple rack arrangement and overhead tramrail crane to serve it, long unwieldy steel stock can be stored in an orderly fashion and grouped according to shape, size and alloy.

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What a vast improvement this is over the haphazard time-consuming way of storing and handling stock still prevalent in so many plants today. There is no tugging, lugging and back-breaking lifting while searching for stock needed. The stock is always in its place where it is quickly found. There is no uncertainty as to the amount on hand, because the supply is out in the open where it can always be seen.

Hundreds of metal-working plants and steel warehouses are now enjoying the many advantages that Cleveland Tramrail equipment provides. There are installations of every type from simple hand-propelled carriers and cranes to complete automatic systems that transport materials without need of accompanying operator.

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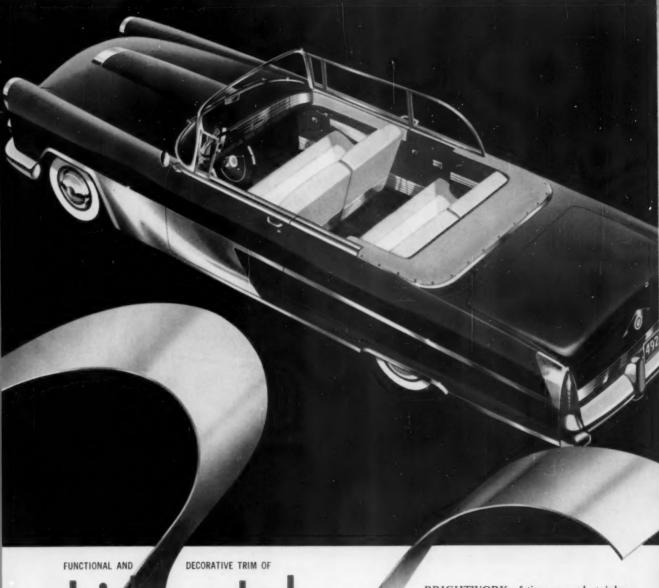


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FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 108.

Stock list

Tool bits, drill rod, and ground flat stock are covered in a new stock list. Eight page list includes thicknesses, widths, lengths, and decimal equivalents in all stocked sizes, as well as a brief description of grades stocked in the above named categories. Firth Sterling. Inc.

For free copy circle No. 17 on postcard

Ceramic machinery

Separate literature on ceramics industry machinery, ball and pebble mills, porcelain pot and jar mills and engineers and ironfounders is contained in a brochure. Loose leaf type folder contains various information on facilities of a firm in Great Britain. Numerous illustrations are included. Jesshope Ltd.

For free copy circle No. 18 on postcard

Resistance welding

Literature describes and specifies standard and special spot welding electrodes, seam welding electrode wheels, dies, back-up bars, shafts, and bushings. In addition, illustrated and specified in this catalog are water-cooled electrode holders, adapters, horn-clamp-holder assemblies, and other accessories. Weldaloy Products Co.

For free copy circle No. 19 on postcard

Press brake

Construction details are described and illustrated in a revised catalog on press brakes. Dimensions and specifications are given for the entire standard line which ranges in bending capacity to 14 ft. x 3/4 in. mild steel. The Cleveland Crane & Engineering Co.

For free copy circle No. 10 on postcard

Submersible booster pump

Firm's line of submersible booster pumps are explained in a four-page folder. Said to be the most modern pump yet available for booster service, it says company's pumps have established themselves as the world's leading vertical turbine units. Bulletin says this know-how has now been applied to submersible pumps. Using a GE electrical motor with a Verti-Line pump bowl assembly, they boast such advantages as: oversize pump shaft, extra length bearing design, protective bearing caps, perihedral impeller seals, and a choice of mixed flow or radial flow performance characteristics. It has a screened suction case. Typical installations and specifications are included. Layne & Bowler Pump Co.

For free copy circle No. 21 on postcard

Materials handlers

Reference book containing 52 pages includes specifications and illustrations of current model fork lift trucks, platform lift trucks, load carrying trucks, industrial tractors and trailers. Catalog is comprised of three major sections: Fork and Platform Lift Trucks. Gasoline and Electric Tractors and Industrial Trailers and Hand Trucks. Mercury Mfg. Co.

For free copy circle No. 22 on postcard

Chemical resist coat

Photo-illustrated four page bulletin describes company's latest development in sprayable plastisols. It explains how plastisol can be sprayed to 60 mils thick in a single application even to cold vertical surfaces. Metal & Thermit Corp.

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Safety solvent

Designed primarily for the in-place cleaning of electrical equipment, a new detergent-action safety solvent is also ideal for hand wiping small parts says a new folder. Precleaning prior to flaw detecting operations, grease pencil, chalk or ink removal and other jobs are described. Folder contains three charts which cover toxicity, flash point throughout evaporation cycle and evaporation rate. Also included are a number of established uses for safety solvents. Turco Products, Inc.

For free copy circle No. 24 on postcard

Fork lift trucks

Modern developments in lift truck operation are presented in a 32-page booklet describing company's new "Pace-Maker" series fork lift trucks. Four new additions are included in the series. A wide range of load capacities from 6000 to 11,000 lb are offered. Townoton Corp.

For free copy circle No. 25 on postcard

Barrel finishing

Complete 52 page book lists barrel finishing equipment and supplies. Over a hundred illustrations highlight descriptions of company's deburring and finishing equipment line. Handling and separating units along with a complete line of deburring and finishing medias are contained. Compounds for deburring and finishing and a review of research and testing laboratories in major metalworking centers also appear. Almco Div. of Queen Stove Works, Inc.

For free copy circle No. 26 on postcard

Pallet truck

Specifications and drawings of a new operator-led pallet truck are contained in a new folder. Among the features: compactness (21½ in. including an 8¼ in. battery compartment, plus length of load), easier maneuverability and narrower aisle space; and a system of spring-loaded pawls while holds the pallet firmly while the forks enter and leave. It has a rated load capacity of 6000 lb. Automatic Transportation Co.

For free copy circle No. 27 on postcard

Reissued catalog

Reissued 12 page catalog contains information on cold drawn mechan. ical, capillary, hypodermic, nickel and nickel alloy tubing to replace the eight page catalog published last year. It describes firm's line ranging in size from 0.008 in. to 1.000 OD with 0.003 to 0.083 in. wall, as well as tubular fabricated parts made in its specialties plant. Included is data on: comparative analysis of alloy types, specifications, standard tolerances, physical properties and relative workability. Stainless Steel Products Div., J. Bishop & Co. Platinum Works. For free copy circle No. 28 on postcard

Radiation-convection

Techniques used in modern process heating, including a highly successful method of combining radiation with convection are covered in a 16 page catalog. With photos and diagrams it shows how latest heating and conveyor systems offer (1) safety due to proper exhaust of solvent laden atmosphere, (2) high energy output (Btu), (3) greater heat energy conservation. (4) precisely controlled heat distribution. and (5) painting and drying of large or slow drying products in minimum space. Jensen Specialties. Inc.

For free copy circle No. 29 on postcard

Products magazine

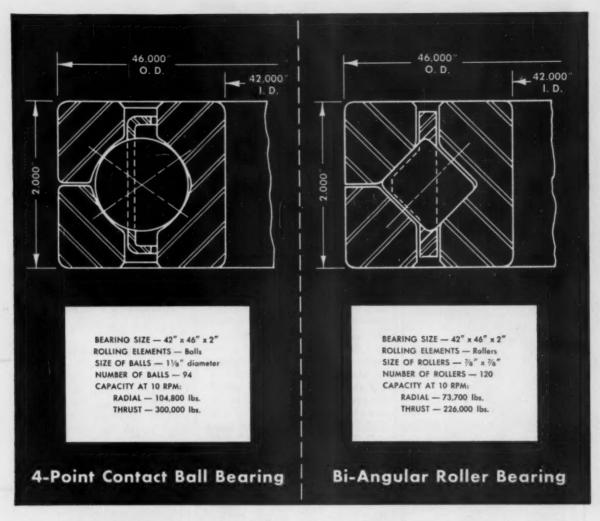
Major manufacturers' 28 page product magazine contains articles on heat exchanger design, dieselelectric drilling rig power packages for the oil industry and firm's new leaded steel for forged rings and gears. Producers' fin-tube heat exchangers, and the new diesel engines are covered. ALCO Products, Inc.

For free copy circle No. 30 on postcard

Koroseal pipe

An eight-page illustrated bulletin on high impact rigid Koroseal pipe, fittings and valves has been published. Brochure explains how pipe is installed, product applications and physical properties. Back page has a chart listing common chemicals handled by rigid Koroseal pipe, fittings and valves. Plastic Products. B. F. Goodrick Co.

For free copy circle No. 31 on pastcard



SURE we make both, but we recommend only one

Yes, Kaydon manufactures both — 4-point contact ball and bi-angular roller bearings in the same diameters and widths. BUT—we would in almost every instance recommend the former. Why? Because our field application reports consistently prove that the 4-point contact ball bearings are better for most applications than the lower capacity bi-angulars (See capacity figures in drawings above.)

Another important difference between the two

bearings is that the 4-point contact ball bearing is not limited to low speeds, whereas the bi-angular normally should not be used above 10 rpm and usually is suitable only for oscillation. Then, too, the torque in the 4-point contact ball bearings is generally much lower.

Kaydon's unbiased recommendations result from years of bearing design, application and manufacturing experience with *all types* of ball and roller bearings up to 124" in diameter. So, why not contact Kaydon first?

K-563

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ENGINEERING CORP.

All types of ball and roller bearings — 4" inside diameter to 124" outside diameter . . . Taper Roller • Roller Thrust • Roller Radial • Bi-Angular Roller • Spherical Roller • Needle Roller • Ball Radial • Ball Thrust Bearings

OPPORTUNITY FOR METALLURGISTS

Stoody Company, top manufacturer of hard-facing alloys (as welding electrodes, rods and wires and as alloy castings), needs metallurgists. The positions involve product quality control, research and development, preparation of technical papers and articles, handling of technical correspondence and some field work. Previous experience in the hard-facing field is desirable but not indispensable. Applicants should have a B.S. degree and a thorough working knowledge of welding processes and techniques.

Salary will be commensurate with education and experience. Beside the usual medical benefits and vacations with pay, we have an excellent profit sharing and retirement plan.

The Stoody plant is located near Whittier, a civic minded community of well kept homes, good schools and churches of all faiths. Los Angeles, a leading cultural and entertainment center, is only fourteen miles away. Within short driving distance are 7000 ft. mountains and excellent bathing beaches.

If you feel you can contribute profitable and usable ideas and would like to be a part of an aggressive organization, address a letter to W. Schumert, General Manager, Box 901, Whittier, California, giving your qualifications, age, present salary and any other information you think we might want. Correspondence will, of course, be held in strictest confidence.

MACHINE TOOLS: Drills

Although twist drills can stand amazing abuse, experts recommend right drill use for right job . . . special drills no problem, they say . . . They can be made easily.

Special drills can be made easily, one group of tool experts say. They recommend use of "specials" whenever possible. "Although twist drills can withstand amazing abuse," they point out, "wear and breakage are reduced by using the right one for each job."

The standard, 118° point angle is adequate for most work, but faster and better production usually results when one of five common variations is used for a given job. Spokesmen for the Delta Mfg. Co. state that the average person can easily grind drills to match requirements of specific metals and plastics if he knows the fundamentals of a good cutting edge.

Variations in the point angle and lip clearance angle have different effects when working different materials, the Delta men say. In general, blunt points are used on harder metals, where there is danger of tearing, and on very thin sheets. Sharper angles are more efficient when drilling plastics or soft metals.

Getting Zero Rake

Grinding off the cutting edge of each lip gives a drill with zero rake. This makes the edge scrape rather than cut. It reduces tendency of the drill to dig into brass and other soft metals and most plastics. It's not good with plastics with low melting points, the experts add, because heat will cause chips to gum and stick to the drill. Zero rake also produces a stronger cutting edge, making it suitable for drilling very hard steel.

Checking Required Arc

Drills, like all cutting tools, require clearance behind cutting edges to permit chip removal. Variation in the clearance angle

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 113. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

changes the size and shape of the chip.

Lip clearance angle is ground by starting with cutting lips against the wheel and then dropping the other end through an arc equal to the lip clearance angle end as the drill is rotated through one sixth of a full turn. Easiest way to determine how much to lower the drill is to swing a new

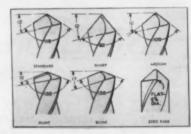


Illustration shows various special drill cutting edges.

standard drill against the stationary wheel, noting how much movement is required to keep the ground surface in contact. This will indicate the arc required for a standard, 12° clearance angle. Other angles can be obtained by proportionate variation of the movement.

The curved face of the web should be thinned after the point is ground in order to reduce the thrust needed to force the drill through the work, they say. The web can be thinned by grinding with a flat-edge or round-edge wheel.

Bench Grinder Attachments

There are also attachments for bench grinders that permit perfect mechanical grinding of drill points of any standard angle. Where points are ground by hand, care should be taken not to burn the drill point.

Most important factor in long drill life, emphasize the Delta engineers, is proper drill press speed. Most well designed drill presses have a sufficient range of speeds for all but extremely specialized drilling.

Non-Ferrous:

Revere installs largest heating equipment

What is reported as the world's largest 60 cycle induction heating equipment designed to heat copper, brass and cupro-nickel to extrusion temperatures has been installed. This progressive equipment is operating in the Rome, New York, tube mill of Revere Copper and Brass, Inc.

Induction Coil Series

Consisting of a series of six electric induction coils mounted parallel to one another, this equipment can feed billets to a 3500 ton extrusion press at a rate in excess of ten tons per hour. This is described as an economical and practical method for heating billets when compared to the former method of heating them in gaseous or liquid fuel fired furnaces which occupied many more square feet of floor space. They also are said to have required much more maintenance.

Due to the rapidity with which a billet may be heated there is no necessity to pre-heat a large number of billets in advance, with all the concomitant problems, nor is there any problem with "scaling" (i.e., oxidation on the surface of the billet.)

The electrical characteristics of the installation are relatively sim-



in mill after mill

Designers and users of modern mills are achieving new high speeds (up to 7200 feet per minute), new high uniformity of gauge, new high quality finish and new high production and maintenance economies. Ajax patented dihedral tooth design is revolutionizing spindle shaft drives. Ajax Dihedral Spindle Shaft Couplings are the talk of hard-boiled steel men everywhere. Write for the facts.

AJAX FLEXIBLE COUPLING CO. INC.
WESTFIELD, N. Y.





To this little fellow building the 1956 "dream car", precision is a bent nail or a split board. To modern automotive engines and aircraft power plants, PRE-CISION is a most important element. That is why CHANDLER specialists are working harder than ever to supply cap screws to closer tolerances to meet your new requirements. Chandler is producing the finest fasteners today in all of its 25 years of experience. Chandler is specializing in mass production of bolts from high alloy steels . . . with special heads or threads . . . with drilled heads or shanks . . . ground to close tolerances . . . and with threads rolled after heat treating.

There is a Chandler cold wrought fastener to meet your specifications. And remember, at Chandler . . . there is nothing special about PRECISION because we do it every day.

RHQ-CH





ple, in that a 2400 v, 3 phase, 60 cycle power source supplies the electrical energy demanded by the 6000 KVA necessary to do the required work.

No Moving Parts

Of interest from a maintenance viewpoint is the fact that there are no moving parts in the units other than the material handling mechanism. There are also no refractories demanding periodic replacement or deteriorating from thermal shock.

Coils Are Cool

The equipment throws off very little heat since the water cooled coils are only a few degrees above room temperature and may be touched during any part of the



This is thought to be the world's biggest 60 cycle unit.

heating cycle. This is a highly desirable condition and eliminates one of the fatigue factors affecting the men who work in the vicinity of the apparatus. Dirt, dust and products of combustion are not created by sixty cycle induction heating equipment. This, the company believes, vastly improves the cleanliness and general working conditions of the area.

Largest Drop-Bottom

In addition to this induction furnace installation, and along with its other current contracts, the Loftus Engineering Corp., Pittsburgh, Pa., has recently completed the largest known vertical drop bottom solution heat treating furnace for extremely long aluminum extrusions, and is also currently engaged in constructing a 600 ton open hearth furnace, the most tremendous open hearth capacity that has ever been built.

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Plating:

Electroplated diffusion alloy formations are studied

Research on elevated-temperature properties of electroplates has reportedly demonstrated the importance of appropriate plating conditions for promoting oxidation resistance. It has also led to new knowledge about formation of diffusion alloys and revealed an important factor in the failure of metal-coated molybdenum structures.

These results of research done for the Navy Bureau of Aeronautics by Battelle Institute, Columbus, Ohio, were stated at the 43rd Annual Convention of the American Electroplaters' Society, Washington, D. C., in a paper by W. H. Safranek and G. R. Schaer.

Plating Conditions

Plating conditions, such as current density and bath composition, were responsible for large changes in the thermal stability and density of electrodeposits of nickel and chromium, alone, or in combination. Best thermal stability of nickel plates was obtained by using a nickel sulfamate plating bath, reports the institute.

Nickel-Chromium Alloy

In their research at Battelle, Safranek and Schaer found that alternating layers of electrodeposited nickel and chromium could be transformed into a homogeneous nickel-chromium alloy by diffusion of the two metals at 1800 F. Even though this temperature was much below the melting points of the two metals, it was sufficient to produce an alloy in the short time of four hours.

Experiments to determine the resistance of several types of electroplates to oxidation at elevated temperatures led Safranek and Schaer to the conclusion that neither nickel nor chromium alone could withstand oxidation as well as their diffusion alloy could. Nickel and chromium alone oxidized at about the same rate, which decreased as length of

exposure to the oxidizing atmosphere increased. The nickel-chromium diffusion alloy oxidized slower than nickel or chromium alone, but faster than a wrought nickel-chromium alloy.

Inspection:

Liquid honing detects imperfections, cracks

A positive method of detecting cracks and other imperfections in new and reground carbide tools depends on surface conditioning.

Liquid honing uses abrasive and hydraulic action to force fine sintered material out of minute cracks or fissures, which then become obvious defects during visual inspection. Because of heat and pressure in grinding, such fissures are nor-



Cracks become visible in carbide tools after liquid honing.

mally sealed and hidden by the sintered material; they do not always appear during inspection by acid etching, magnetic particle inspection or fluorescent penetrant checking.

Liquid honing removes burrs and grind lines, and produces a satin matte finish without dimensional change. Inspection processing can be done at a rate of more than 100 single-point tools per hour.

Other uses for standard liquid honing machines, made by the Vapor Blast Mfg. Co., include such toolroom and production-line operations as surface finishing, cleaning, descaling and deburring.



July 1956 Fortune Reveals

DETROIT STEEL

scored the year's biggest individual gain in sales-ranking among the 500 largest U.S. industrial corporations.

DSC Climbed to 302nd Position in 1955 from 484th in 1954 on a 97% Rise in Sales to \$101,800,000

This sales performance offers evidence of customer confidence in DSC products and services.

It confirms our own confidence in again increasing ingot capacity from 1,290,000 tons to 1,500,000 tons and further expanding our facilities for producing hot and cold rolled sheets as well as other DSC products—in 1956.

It re-emphasizes the soundness of two basic ideas by which we have always tried to run our business:

- Customer satisfaction is everyone's No. 1 job at DSC.
- The proof of DSC steel is in its performance on the customer's job.

Thanks to our customers and employees who helped make this sales performance possible.

> My Junar President



CORPORATION

GENERAL SALES OFFICE, DETROIT 9, MICHIGAN CUSTOMER "REP" OFFICES:

Charlotte, N. C., Chicago, Cincinnati, Cleveland, Columbus, Ohio, Dayton, Ohio, Detroit, Grand Rapida, Mich., Hamden (New Haven), Conn., Indianapolis, Jackson, Mich., Louisville, Ky., New York, St. Louis, Toledo, Worcester, Mass.

DSC MILL PRODUCTS

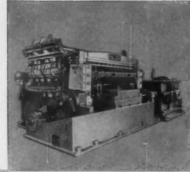
Hot Rolled and Cold Rolled Sheets

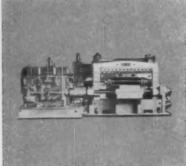
Cold Rolled Carbon Steel Strip + Flat Cold Rolled Carbon Spring Steel
Low and Med. Carbon Manufacturers' Wire + High Carbon Specialty Wire
Aluminum Cable Strand Reinforcement + Rope Wire + Tire Bead Wire
Welded Wire Fabric

MILLS PORTSMOUTH, OHIO (Sheets, Rods, Wire)
DETROIT, MICH. and HAMDEN, CONN. (C.R. Strip)

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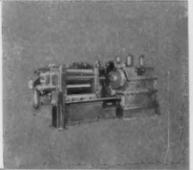
flexible design

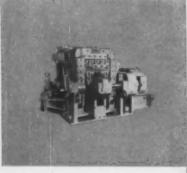




cutting accuracy

continuous feed





rugged construction

Automatic Shears

by HALLDEN

"the shearing specialists"

THE HALLDEN MACHINE CO.
THOMASTON, CONNECTICUT

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The Wean Engineering Co., Inc., Warren, Ohio (Ferroe)
T. E. Dodds, Pittsburgh, Pa. (Non-Ferrous)
W. H. A. Robertson & Co., Ltd., Bedford, England
(Ferrous & Non-Ferrous)

TECHNICAL BRIEFS

Controls:

Big panel automatically directs mill operations

A 47 ft 8 in. panel, part of a variable voltage dc motor control for an electric weld pipe mill, has been unveiled. The over-all length of the assembled lineup, including a section now shown here, is 62 ft 4 in. The panel is 75 in. deep and 90 in. high.

Controls Skelp Cutting

Manufactured by the General Electric Co., the control will be installed in one of the largest steel mills on the Eastern seaboard. It will automatically direct uninterrupted operations of bringing skelp from a hot strip mill into an electric weld mill. It will control cutting the skelp to the exact desired length and width,



Part of the 62 ft 4 in. variable voltage dc motor control panel.

clean it, and prepare the surface for welding. It will handle forming it from flat sheet steel into tube form, weld the seam, trim off beads, anneal it and convey the tube through a number of cleaning and inspection stations. It will even control delivery to a shipping area. Eighty motors range from 1½ to 200 hp. All are controlled by the one lineup of panels.

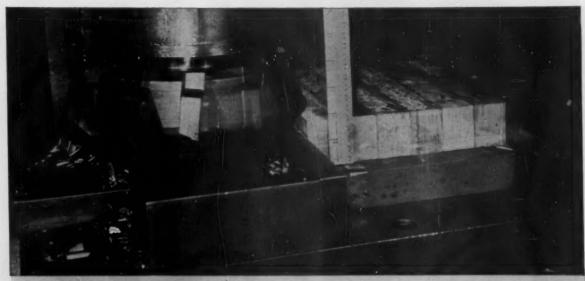
Tailor-Made Panels

The tailor-made control panels represent more than nine months of engineering effort by GE. It is the largest control unit yet turned out at the firm's new Roanoke plant.

CARMET "

STEEL-CUTTING CARBIDES

OINCREASE PRODUCTION @GIVE UP TO 50% LONGER LIFE





DETAILS OF JOB ILLUSTRATED

 Machine
 Sundstrand Rigid Mill

 Cutter Size
 10" Diameter

 No. of Teeth
 12

 Carbide Inserts (grade)
 Carmet CA-610

 Rate of Travel
 400 S.F.P.M.

 Table Speed
 10 In. per minute

 Depth of Cut
 ½ inch

 Material
 1095 Cold Drawn Shank

 Steel, 200 Brinell

READY FOR YOU

Complete Technical and Shop Data on the Carmet "CA-600 Series" of special steel-cutting Carbides

White for Your Copy

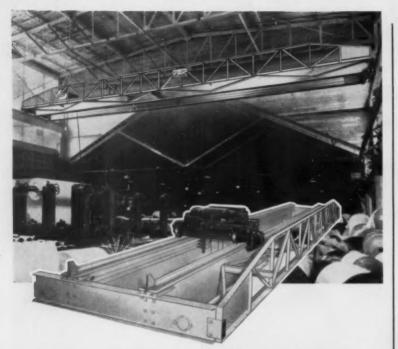
ADDRESS DEPT. A-80

Here's something special for you: the new Carmet steel-cutting grades of carbide, called the "CA-600 Series." One of the grades is shown above in a milling operation—a tough job where the major requirement was continuous production. Cutters equipped with Carmet CA-610 inserts not only increased the production of the machine on this job, but actually gave 50% longer life than the comparable cutting materials previously used.

These heavy-duty CA-600 Carmet grades (premium products in performance, at no premium in price) have been thoroughly job-proved in the field. They're available to fit your steel-cutting requirements . . . let us arrange a demonstration of their ability to save time and money for you. Get in touch with your nearest A-L representative or distributor, or address Allegheny Ludlum Steel Corporation, Carmet Division, Detroit 20, Michigan.

Allegheny Ludlum





YOU SAVE THREE WAYS WITH A CRANE LIKE THIS

Series "D" 'Load Lifter' Cranes are economical to buy, use and maintain. They are built in 1 to 20-ton capacities to meet average industrial needs, but mass production methods make them available at prices substantially lower than other cranes for the same services.

Series "D" 'Load Lifter' Cranes incorporate operational features found on only the most expensive cranes. They utilize modern construction techniques and components that eliminate needless dead weight and drag. They do not whip or skew. Consequently, whether the span is 20 feet or over 50 feet, high performance is coupled with low power consumption.

Maintenance is never a costly problem with Series "D" Cranes. All gearing operates in oil in sealed housings. Anti-friction bearings minimize wear. Rotating axles carry the bridge and trolley wheels. Long wheel bearing life is assured.

Series "D" 'Load Lifter' Cranes have positive magnetic control: push button on floor-controlled cranes; master switches on cage-controlled cranes. Whatever size, type, trolley style or span you require, you can order what you want from Catalog 221. Write for a copy and learn how much you can save with a Series "D" 'Load Lifter' Crane.



Load Lifter CRANES

MANNING, MAXWELL & MOORE, INC.

MUSKEGON, MICHIGAN

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Makers of 'ASHCROFT' Gauges, "HANCOCK' Valves, "CONSOLIDATED' Safety and Relief Valves, "ARRICAN" AIMERICAN.

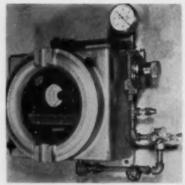
Instruments:

Hydrogen in steel furnace atmospheres measured

Concentration of one gas in mixtures of gases now can be measured more specifically without sample conditioning procedures by means of a new instrument.

Developed in Mine Safety Appliances Co. laboratories, measurements are based on the usual thermal - conductivity principles. However, they also take advantage of convective heat loss.

Four detector cells are used instead of the usual two in which heat losses from identical filaments in a gas sample and refer-



Four detector cells are used instead of the usual two.

ence atmosphere are compared. The two additional cells are large in diameter so as to promote convective heat loss. Filaments of the four cells are arranged to maximize gas effects.

Steel Furnace Measurements

Applications of the instrument to measurement of ethylene oxide in carbon dioxide and in mixtures of hydrogen, carbon dioxide, and air are described. The measurement of hydrogen in steel furnace atmospheres, and measurements of hydrogen, carbon dioxide, and methane in mixtures of these three gases with air or nitrogen are reported. Application of the instrument to a variety of gas analysis problems has been accomplished.

Quantity PRODUCTION of GREY IRON CASTINGS

ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES

ESTABLISHED 1866

THE WHELAND COMPANY
FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS

CHATTANOOGA 2, TENNESSEE

Testing:

Novel method measures input-output torque

Measuring input and output torque of variable speed drive units by means of a novel reversible method has solved a problem in the time requirements for production tests. They are made in a capacity range of 0.5 to 10 hp.

The method is based on electrical measurement of bending strain in horizontal cantilever beams which restrain the cradled drive motor and output dynamometer from turning. Bending strain is measured by resistance wire strain gages and transmitted to a dial indicator on which torque up to 1250 in. lb can be read.

Two Restraining Members

The two restraining members are standard load beams made by Baldwin-Lima-Hamilton Corp. and have a capacity of 50 lb with end loading. Instrumentation was also designed by Baldwin. A 300-division scale, provided by two add steps for the 100-division dial, reads 5 in. lb per division up to 1250 in. lb.



Torque measurements in tests are made with load beams.

The test method was devised by Cleveland Worm & Gear Co. for testing its speed variators. These units provide infinitely variable speed through the rolling action of a series of angularly positioned balls and beveled drive discs and have a speed range of 9:1 from a constant speed drive. The test



Making coke is a specialized business, and requires special equipment like the cars below. Coke plant operators prefer Atlas Cars because they are dependable.





COKE QUENCHER



HYDRAULIC DOOR MACHINE



40-TON COKE TRANSFER CAR





THE ATLAS CAR & MFG. CO.

ENGINEERS 1140 IVANHOE RD. MANUFACTURERS CLEVELAND 10, OHIO, U. S. A.

POPULATION POPULATION REW HOUSING STAINLESS STEEL INGOT PRODUCT NOW! you can grow

with <u>your</u> markets

- ... because Washington Steel Corporation has taken two big steps forward:
 - Making available an adequate and dependable source of supply for Type 430 stainless steel.
 - 2. Reducing the base price of Type 430 sheets to provide you with savings of \$200 per ton as compared to Type 302 stainless sheets.

Many designers and fabricators who are currently using Type 302 stainless can, in numerous applications, specify Type 430 straight chromium stainless and take advantage of the 10 cents per pound difference in base price. Some of our customers are already saving more than \$200 per ton using our 430 MicroRold stainless steel.

The steel industry estimates that 50% of all stainless sheet applications could satisfactorily employ Type 430,

the least expensive of all stainless grades, as an economical and practical material. When properly applied, Type 430 has all the desirable qualities of beauty, corrosion resistance, strength, long life and low maintenance that no other material, *except* stainless, can offer.

We are currently producing our MicroRold Type 430 sheets in thicknesses .005" to .109" with 2B or 2D finishes; and in thicknesses .010" to .109" in No. 3, 4 and 7 finishes.

Type 430 sheets are immediately available for delivery without restriction. We are supplying the 18-8 grades against rated orders only.

Washington Steel

Corporation

8-L WOODLAND AVE., WASHINGTON, PA.



Send for your copy, "Care and Use of 430 Stainless"



An Orderly Salvage Program... Built Around a G-H Hydraulic Baler... Could be the Solution!

A well integrated scrap metal salvaging operation, built around the right kind and size of scrap metal baling press, may be the key to neat, orderly disposal of your sheet metal scrap... profitably... with minimum disturbance to production.

Galland-Henning Hydraulic Balers for sheet metal scrap are fast, powerful, rugged and efficient. They convert stampings, clippings and other light sheet metal scrap into dense compact bales always in demand by mills, foundries, and smelters.



GALLAND-HENNING SCRAP METAL BALING PRESSES

TECHNICAL BRIEFS

stand is equipped with a 10 hp motorized Variator to provide regenerative braking.

Important Advantages

Important advantages reported for this torque measuring system are its simplicity, small size, the short time required for completing each test, and reversibility, which is difficult by other larger equipment. Zero adjustment is also simple with this instrument and accuracy has been found to be at least equal to that of other more conventional equipment. Quick determinations of shaft speed are made by means of a magnetic pickup and digital counter.

Alloys:

Silicon steel laminations cut TV transformer heat

Better and more economical transformers for use in television receivers are promised with a newly developed heat conducting compound. The material has been in development for a number of years and is now manufactured by the Foster Transformer Co. of Cincinnati for use in potted transformers.

Definition of a Transformer

A transformer converts electrical energy from an available potential to either higher or lower potentials as required by the equipment it is serving. Losses involved in this process appear as heat. Temperature rise of transformer windings, caused by heat, is a limiting factor in transformer design and application.

Generation of Heat

This heat is generated in the windings' copper conductors and in the steel core material. Part of the total heat coming from the core is lowered by using better grades of silicon steel laminations.

Air Circulation Is Common

It is common practice to depend on air circulation for cooling. However, Foster believes conventional construction provides a very poor path for heat traveling from inner windings to the outer surface.

A typical TV transformer may have a difference in temperature from the inner windings to the outer surface of 20°C to 25°C when measured according to standards of the Radio-Electronics-Television Manufacturers



Potted transformer uses a plastic-like substance to cut heat.

Assn. When this transformer is potted with the Foster compound, this difference is said to be reduced to about 10°C to 15°C.

With color television the more complicated electronic circuits require larger transformers, Advantages of a heat conducting compound are expected to be utilized to a greater degree with color sets.

Metals:

Race champ may build car of magnesium; stock body next?

When the winning car crossed the finish line at the 40th Indianapolis 500 Race recently it set a new kind of record. This was the first time that magnesium had been used in the body of a car entered in the speed classic. Moreover, reports the Dow Chemical Co., race car owner John Zinc may return next year "with a car equipped with a body made of

...Wire of High Finish for Electroplated Products in Many Shapes & Sizes



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FOR OVER HALF A CENTURY

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Gentlemen: Please send us complete information concerning the new Continental #3 Finish Wire for Electroplating.

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Helping to "PAINT" your TV picture WALLINGFORD Stainless Steel Strip

This electron gun generates the pencil-like electron beam, or "paint brush," which sweeps across the fluorescent face of your television tube to "paint" the picture.

Vital elements of this gun are formed from Wallingford Stainless

Steel Strip held to extremely close tolerances to provide the uniform
electrical characteristics that assure efficient, dependable performance.

We offer this "television commercial" as one evidence of Wallingford's ability to meet YOUR most rigid specifications, whatever your design or manufacturing requirements. Visit our office and plant for even more positive proof.

WALLINGFORD

WALLINGFORD, CONN., U.S.A.

SUPER METALS

STAINLESS • ALLOY • HIGH CARBON • LOW CARBON • STRIP

STAINLESS WELDED TUBES AND PIPE

"A body made of magnesium from grille to tail . . ."

magnesium from grille to tail."

Speculation as to its use for private car bodies was not reported. Although, for the racing car, Dow claims it allows delivery of "maximum acceleration faster coming out of the turns on the big track." "A lighter car," the major magnesium producer says, "can brake faster and generally is safer to handle."

Carried More Fuel

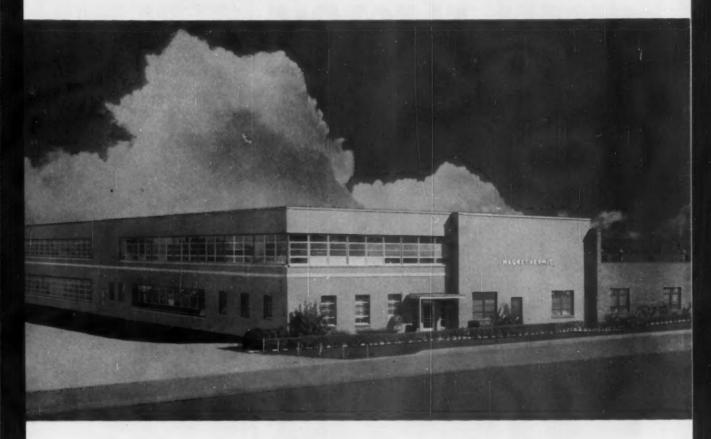
The car owners boast of its lighter weight and all the benefits that go along with it (i.e.: 145.490 top speed.) "By reducing the dry weight of the car we could enlarge the main fuel tanks and carry an extra small fuel tank in the driver's compartment," says designer Michael Scott. "The tanks carried 77 gal. of fuel at one filling, which meant that the car could go the entire 500 miles on one pit stop, making one change of tires and one refueling," according to Scott.

Whatever the future value of magnesium on stock automobiles, there can be little doubt as to its acceptance in racing. Halibrand Engineering Co., Culver City, Calif., provided magnesium wheels as "standard equipment" for cars in the classic.

Magnesium and Aluminum

To lighten the body Scott used magnesium and thinned-down aluminum. For the nose, tail section and hood he used 0.051 in. aluminum sheet (compared to 0.064 in. in the owner's previous car.) For all other body panels, including the underpanning, he used 0.051 in. magnesium sheet. The parts in magnesium were one third lighter than they would have been if aluminum had been used. The magnesium sheet was contoured on an English Wheeling Machine, consisting of two manually-operated shaping wheels that exert pressure on the metal. John R. Gibson, of Reliance Magnesium Co., Los Angeles, furnished technical

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Is heating or heat-treating involved in your metal-working process?

If so, let a Magnethermic engineer review your operations and show you what induction heating can do for you.

For example, Magnethermic has designed high frequency equipment for continuous localized heat-treating of electric welded pipe. Another Magnethermic installation pre-heats 32" diameter aluminum ingots, weighing 5,000 pounds, prior to extrusion.

Magnethermic's plant at Youngstown houses diversified facilities and specialized personnel devoting full time to induction heating. Low, Dual and High frequency.

Whether your inquiry concerns heat-treating, hot working or joining, Magnethermic can do the job. For specialized, intelligent attention, place your inquiry with the specialist—Magnethermic.



Ready-Power Continuous-Duty

DIESEL ELECTRIC

POWERS INDUSTRY'S LARGEST LIFT TRUCKS



This 80,000-lb. twin ram lift truck, operated in one of America's largest steel mills, is equipped with interchangeable Ready-Power diesel electric model RD-18. Continuous duty full power is assured at all times. The low operating and maintenance costs attained are possible only through the use of diesel-electric drive. Ready-Power offers a full range of diesel electric and gas-electric models for all truck sizes. Write for complete information.

READY-POWER

The READY-POWER Co., 3822 GRAND RIVER AVE., DETROIT 8, MICH.

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Tracks

TECHNICAL BRIEFS

advice on weld fabrication and stress relieving.

Magnesium sheet also was used for the firewall and instrument panel. The four wheels, brake anvils, differential housing and steering gear housing are magnesium castings. The car weighed from 178 to 240 pounds less than its



Car's firewall, underpanning and wheels contain magnesium.

predecessor. Compared to the car that finished second, it was 148 to 210 lb lighter. Zinc's mechanic believes a lighter weight car reduces wear on tires and keeps them cooler. This receives some support due to the fact that at least three cars were crippled by blowouts during the race.

Non-ferrous:

Vacuum-melted nickel-base alloy takes 1240°F

A comparatively new vacuummelted nickel-base alloy is proving to be suitable for extended operation under load at temperatures of 1240°F, it was revealed recently by engineers at General Electric's Metallurgical Products Dept., Detroit.

Already being used in the form of forged buckets in the first stage of heavy-duty land gas turbines produced by General Electric's Gas Turbine Department, Schenectady, N. Y., the alloy is reported to exhibit high rupture strength, good fatigue strength and high resistance to thermal shock.

As a result, according to GE, the material is now being used as buckets in four 7600 hp gas turbines now in operation. These operate at 1240° at 6900 rpm.

New Films:

"NMTRA Motion Picture Booklet" lists 123 films on machine tools and operations. Twenty-four pages list 79 in color. Ranging from 10 to 40 min. show time, they are available without charge. Most films are for sales or training and consequently concerned with specific machining operations. However, some tell interesting and educational stories of machine tools' part in raising man's standard of living. Most films are 16mm sound. Requests are asked to be made three or four weeks in advance. Films available from member concerns. Booklet available from: National Machine Tool Builders' Assn., 2017 E. 102nd St., Cleveland 6.

"Hobs and Hobbing," is latest machine tool film produced by the R. M. Schmitz Studios of Madison, Wis., for the Barber-Colman Company of Rockford, Ill. The 20-minute sound-color film demonstrates new techniques in gear cutting. Wisconsin Public Relations Institute, Madison, Wis.

"Tracer Control in Action" is a 16mm full-color film with an explanatory narrative on the sound track. Running time: 36 minutes. It portrays versatility and freedom



Cameraman shoots a scene from film "Tracer Control In Action."

of machine action built into company's pantographs and duplicators. Difficult or otherwise impossible milling, profiling and engraving

"LITTLE STEVE" PAYS OFF

by A.

by A. B. HOEFER
vice president
FREDERIC B. STEVENS, INC.

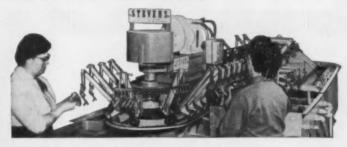
THE FINISHING

Production Plater Finds Machine Ideal For Zinc Plating

There's a feeling of satisfaction among the people in our company when a Stevens machine is installed and does a better job than the customer anticipated. That feeling reaches all the way from President through engineers, salesmen and typists who write up the specifications.

We are particularly proud of an installation of one of our "Little Steve" machines made recently for the Miller-Smith Manufacturing Company, Spring Lake, Michigan. The partners, John Miller and George Smith, are operating an aggressive business in job buffing and plating, and after receiving some of our literature including a story on the "Little Steve," soon made a purchase from us.

The "Little Steve" fit ideally into their program. The capital outlay met their requirements and the machine is daily turning out a big quantity of zinc plated parts for them. In fact, 105,000 can be plated each working day, which right now is an around-the-clock operation. Just as soon as new racks are built they expect to double present production on some of the parts.



The Miller-Smith management tell us that they are operating much more efficiently now than they did previously with a competitive machine. Parts are being zinc plated to a .0002 thickness every three minutes. They are saving on valuable floor space too, for the "Little Steve" occupies only 162 square feet as compared to 441 square feet used by their previous equipment.

When we asked for comments about the "Little Steve" from Messrs. Miller and Smith, they said: "We are well pleased with the machine—in fact, we're proud of it. We'll be glad to recommend it to anyone." While we are not unused to such comments on our various machines, each new one gives us a warm glow of satisfaction.

This efficient machine fits easily into existing factory layouts because of its size. Only seven feet wide and ten or more feet in length, it can be placed on a factory floor without moving existing machinery.

For further information write to Frederic B. Stevens, Inc., Detroit 16, Michigan.



METAL FINISHING EQUIPMENT AND SUPPLIES FROM CASTINGS OR STAMPINGS TO FINISHED PRODUCT

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TECHNICAL BRIEFS

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COMPLETE PLANTS designed, constructed, and equipped as an integrated unit for efficient and economical production.

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SPECIAL EQUIPMENT industrial furnaces, ovens, gas generators, and dryers—all fuels—field or shop erected.

PRODUCTION LINES tailored to individual needs requiring mini-

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30 Years' Extensive Experience

insures prompt service in planning and production by experienced engineers who know industry's problems. Our numerous sales and service centers keep in constant touch throughout all phases of the work.

Write for Booklet No. 135

This booklet covers the scope of CONTINENTAL Service. It is well illustrated with views of CONTINENTAL installations with descriptions of the equipment and the processes performed.



524

CONTINENTAL INDUSTRIAL ENGINEERS, INC.

176 W. Adams Street, Chicago 3, Illinois

DISTRICT REPRESENTATIVES

Ridgewood, N. J. • Indianapolis • St. Louis • Detroit Cincinnati • Milwoukee • Cleveland • Pittsburgh operations are shown being performed on tracer-controlled machines which are not restricted by gear-driven constant feeds nor by longitudinal and transverse lead screws. Film was photographed under actual shop conditions. Available on free loan basis on letter-head request; user pays return special delivery postage. George Gorton Mach. Co., 1321-N Racine St., Racine, Wis.

"Vacuum Melting" is a new color film on vacuum melting of alloys. The 17 minute film traces the complete process. Beginning at the conference table where the melt content is discussed, the route is then traced from test melt on to the finished ingot. Metals Div., Utica Drop Forge & Tool Corp., Utica, N. Y.

"The Spray's the Thing," a humorous 131/2 minute color cartoon on the contributions of aerosols to everyday living, has been seen by more than 16 million persons since its release. Narrated by "an inhabitant of Bug Valhalla," it traces the growth of aerosols from their inception during World War II and high-lights many of the amazing uses of the propellent in industry. Produced by John Sutherland for Du Pont, it has been on TV 164 times and has been screened 1178 times in clubs, schools, industrial plants, churches and other community organizations. Film may be borrowed, at no charge except transportation. Association Films' regional libraries: Ridgefield, N. J. (Broad at Elm), La Grange, Ill. (561 Hillgrove Avenue), San Francisco (351 Turk Street) and Dallas (1108 Jackson Street).

"Always On The Job" is a sound slide film covering basic principles of safety in electric arcwelding. A companion film to company's prize winning oxyacetylene film, "The Guy Behind Your Back," it features light, cartoon approach. Record is 33½ rpm speed. Loaned free on request. May be purchased for \$15. 20 minute run. Air Reduction Sales Co., 150 E. 42nd St., New York 17.

A NEW IDEA...in hydraulic power and control systems

Solenoid Controlled Pilot Operated Directional Valve (Optional) , 2.2, 3.7 or 5.2 gpm (@ 1800 rpm) Balanced Vane Pump—1000 psi max.

Balanced Piston Relief Valve

Pressure and Return Line Connections on Back of Panel

Panel Contains
Oil Passages
Between Pump
and Valving So
that All External
Piping is
Eliminated

A Second Solenoid
Controlled Pilot
Operated
Directional Valve
Can Be
Provided Here
For Control of
Additional Operations

VICKERS.

Series TB

HYDRAULIC

PIPELESS

POWER PACKAGÉ

1, 1½ or 2 hp Motor (@ 1800 rpm) (New NEMA Frame Size Specifications)

> Pump and Valving All Gasket Mounted

Check Valve in Panel When Directional Valve Included

Here is a new and extremely compact "package system" for providing hydraulic power and control to a wide variety of industrial machinery applications requiring low hydraulic horsepower. These include clamping, gaging, transferring, rollover, elevating, indexing, chuck and clutch operations, etc.

8 Gallon Reservoir

with Suction Filter

Note the many features indicated on the photograph above. The result is improved and simplified hydraulic design . . . also reduced installation and maintenance costs. This "package system" has great flexibility . . . is available in a wide variety of combinations of standard components assembled to suit individual requirements. Pretested and ready for immediate operation, it has also the advantage of undivided Vickers responsibility. For further information, ask for installation drawings 178706-8.

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IN CANADA: Vickers-Sperry of Canada, Ltd., Toronto

These "package systems" supplement the Vickers line of standard hydraulic power units.

ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

7311



New and improved production ideas, equipment, services and methods described here offer production economies...for more data use the free postcard on page 113 or 114.



Deburring, chamfering model works both gear sides

Simultaneous deburring and chamfering of both sides of splines or gears is performed on this new two-station machine. Both stations can be used for deburring and chamfering of the same size and type of gear or spline. Different parts can be handled on each station. Output rate at each station is up to five teeth per second with spur gears. Helical gears and straight sided or involute form splines are handled readily. One model, a duplex, has a work range from 0.625 in. to 6.5 in. pitch diam

with another handling work from 3.0 in. to 9.5 in. pitch diam. Entire tooth form, including root of both gear sides or splines, is completely deburred and chamfered on the duplex machine utilizing patented cutting action. Chamfer depth is infinitely adjustable. Work cycle is automatic and an electric clutch stops machine with cutters withdrawn for loading and unloading. Separate motors and controls are supplied for each work station. Modern Industrial Engineering Co. For more data circle No. 32 on postctard, p. 113

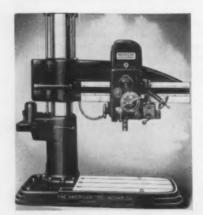


Unit puts pressure sensitive tape on polished metal

Said to be the first commercial unit designed for mechanical application of pressure sensitive tape to protect polished metal sheets, this machine covers a 12 ft. sheet side in one minute. Prior to 1953 when the company first tackled the job of applying tape in wide sheets, application was done by hand. It consists of two basic units, an applicator carriage which carries, unrolls, applies, and cuts the tape, and an applicator table. Two

models are now available for application of protective tape in widths to four or five ft. Both have 12 ft applicator tables. Floor space needed is approximately 16 x 4 or 16 x 5 ft. Rails carrying the applicator carriage project two ft beyond table ends. Table, mounted on wheels, can be moved to any location. Floor clamps prevent moving. Minnesota Mining & Mfg. Co.

For more data circle No. 33 on postcard, p. 113



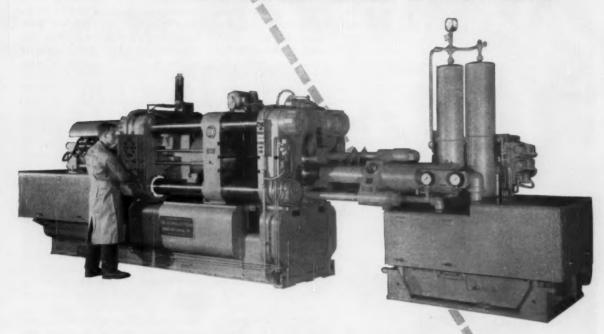
Flipping a lever reduces boring range by 75 pct

In connection with company's new deluxe models of their nine and 11 in. column radial drills, they are offering an attachment for tool and die shops. Known as a Fine Feed boring attachment, it is being recommended by the maker to shops doing any boring on radial drills. The fine feed range for precision boring is reported as being ½ of the standard range supplying six feeds from 0.001 to .00625 in. per revolution of the spindle. Furnished by the company in addition

to the standard feeding mechanism, it is said to now be in use in many tool and die shops. The change from the standard feed range to the fine one, or vice versa, is made instantly through a conveniently located lever at the lower right-hand side of the head. High precision, fine finish boring of jigs and fixtures is reported by the manufacturer. Flipping lever reduces standard feed range 75 pct. The American Tool Works Co.

For more data circle No. 34 on postcard, p. 113

THE INCOMPARABLE H-P-M DIE CASTER



First Completely New Die Casting Machine In 15 Years

This new machine is the answer to many of today's die casting problems . . . cleaner castings . . . negligible scrap . . . better dimensional control with production output to meet any job requirement. It's time proved through four years of development with one year acceptance in the field.

H-P-M's all new hydraulic-mechanical link wedge clamp and new design injection end result in a brand new approach to die casting technique. Accurate closing of mold eliminates excessive flash. The new clamp has plenty of "beef"—clamp locks mold firmly to at least the rated tonnage and "beef" limits die parting on overload during metal injection. The new injection end has unlimited motion control . . . exceptionally high speed. Get the complete story on this new H-P-M before you buy. You'll be glad you did,

Write today for complete specifications for the new H-P-M die casting machines. Available in a range of sizes from 200 to 1500 ton capacities. THE HYDRAULIC PRESS MFG. CO.





Annealing oven has temperature range to 1300°F

Designed for pre-heating, stress relieving and heating treatment in small or large batches this new oven features diagonal forced air circulation. Oven's temperature range is to 1112°F (600°C). Constructed with triple side walls, they are air mechanically converted by alloy turbo blowers from both side walls containing Modella heater banks. Among its highlighted features are: (1) alloy radiant heat shielded, (2) Multiple channeled side walls with perforated and staggered openings provide means of directed constant air flow, (3) automatic electronic indicator and controller and/or automatic timetemperature programmer, for complete programming of temperatures, (4) exterior construction of heavy gage steel with structural reenforcements providing a strong, rigid unit, (5) 51/2 in. dual high temperature insulation is used. (6) interior, including heat shields, is of heavy gage 18-8 alloy. Ovens are also available in temperature range to 1300°F (704°C). A counter-balanced, double chain sprocket, ball bearing lift eliminates binding and permits easy door lift. An air operated type is also available. All electrical parts are UL approved. Blue M. Electric Co.

For more data circle No. 35 on postcard, p. 113

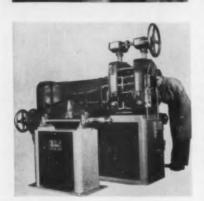


Lathe will accomplish light turning, metal spinning

Company's first lathe in this size range is a new low-cost, big capacity 12 in. machine. Actually a wood lathe, it is adaptable to metal spinning, polishing, sanding, fluting and reeding. Company calls it "ideal for light turning of metals." More than 50 accessories are available for it. Variable drive offers an extremely low speed of 340 rpm for heavy or rough turning and an infinite choice of speeds up to 3200 rpm. This is described as a safe high speed for sanding, polishing,

metal spinning and similar operations. Lathe offers a capacity of 38 in. between centers, 12 in. swing over the bed and 16½ in. swing over the gap with stock up to 3½ in. thick. Its massive construction throughout promises continuing accuracy and relatively maintenance-free operation, firm says. Its drive incorporates a counter shaft for uniform power transmission at all speeds. Delta Power Tool Div., Rockwell Mfg. Co.

For more data circle No. 36 on postcard, p. 113



Rolling mill can employ work roll diameters to 3/4 in.

Equipped with $1\frac{1}{2}$ in. diam work rolls and five in. diam by eight in. face width backup rolls, this two high-four high combination rolling mill can employ work roll diameters as small as $\frac{3}{4}$ in. Rolls are driven through torque arms from a fully enclosed pinion stand with radial loads being taken by heavy duty ball and roller bearings controlling axial movement. Each backup roll bearing has a radial load capacity

of 70,000 lb equivalent to a maximum roll separating force of 140,-000 lb. Roll adjustment is controlled by a single handwheel worm gear screwdown with micrometer dial graduated in 0.001 in. with provision to adjust roll parallelism Roll frames are made of high tensile castings to withstand loads in excess of usual requirements with low deflection. Stanat Mfg. Co.



Machine flares, faces, chamfers, bores both tube ends

Equipped with an inclined feed hopper, this automated five station machine flares, faces, chamfers and bores both ends of various length tubes. Of the double end, in-line transfer type, it has an overhead transfer bar arrangement. It can rough and finish bore opposite ends

of tubular steel at a rate of 414 per hr at 80 pct efficiency. Both air and hydraulic power operate it. Hopper has an air-powered feed that handles tubes in pairs. A rack unloader removes parts. Expert Automation Machine Co.

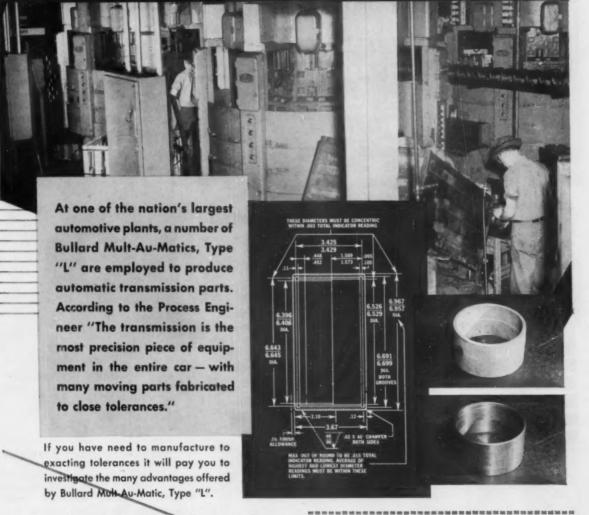
For more data circle No. 38 on postcard, p. 113

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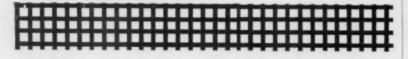


Air Force gets most powerful spar milling machines

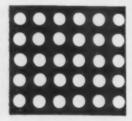
Now being turned out for the Air Force, this is the first of 30 A.I.A.-type milling machines to be used in production of spars. Three types are being produced: (1) single carriage units with straight horizontal heads, (2) single-carriage machines with straight vertical heads and (3) double carriage machines with horizontal twist heads and vertical twist heads. The mill is

the most powerful ever produced, according to the manufacturer. It has a carriage speed infinitely variable from 0 to 300 ipm. Miller has four 100 hp milling heads. Each head has an independent in-out, rise-fall tracing control from cams by means of hydraulic tracing valves. It accommodates 3 x 60 ft parts. Wiesner-Rapp Co.

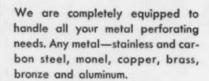
For more data circle No. 39 on postcard, p. 113

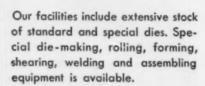


metal perforating? let WISSCO do it

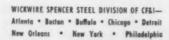


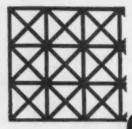
promptly...efficiently ...economically





We can furnish stock to be perforated or it may be supplied by you.





WISSCO PERFORATED METALS

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION THE COLORADO FUEL AND IRON CORPORATION

Side shifter attachment

An entirely new side shifter attachment is available for one company's line of stand-up and sit-down industrial trucks. It provides a full eight in. of travel, ruggedness for long, trouble-free service, and it is com-



pact and light. A double acting hydraulic cylinder provides four in. of travel either side of the center position. Full length bronze wear plates have replaced anti-friction bearings. Lamson Mobilift Corp.

For more data circle No. 46 on postcard, p. 113

Laboratory grade carbides

New cemented carbides, produced to laboratory grade standards, are now available including lathe centering blanks, roll turning and milling cutter blades and solid cylinders. Centerless ground lathe center blanks are carried in seven sizes and grade FA5, suitable for general machining and wear-resistant use. Tolerance on diameter runs +0.000, -0.002 in. Roll turning blanks, ground on all surfaces, have rounded corners. Firth-Loach Metals, Inc.

For more data circle No. 41 on postcard, p. 113

2689

THE ELECTRIC DETECTIVE is an apt description of the Magnatest FM-100 Conductivity Meter. Magnatest uses the electrical conductivities of materials as a measure of uniformity, hardness, purity and other characteristics. A small hand held coil induces eddy currents in the test material, which in turn affect the impedence of the coil in proportion to the conductivity of the material.



IT'S JUST A LITTLE CRACK, but it's a serious matter when it shows up on an industrial crane hook. In fact, to the naked eye it may appear to be a scratch, at most. Yet it can open further and further under load. The end result: failure in service and subsequent costly damage. Photo above shows a Magnaflux indication of such a crack in a crane hook.

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Case Studies: NONDESTRUCTIVE TESTING SYSTEMS



How Periodic Inspection Ups Production by Preventing Equipment Failures

When industrial equipment fails in use, it usually results in lost time, production, or even life! In each case there is a corresponding loss of money. The amount, of course, depends upon the circumstances. Periodic inspection with an M testing system can foretell the exact nature and extent of structural weaknesses in your machinery, tanks, or equipment.

Invisible hairline cracks are warning signs of future fatigue failure. The M tests detect such signs in any material. You can take the proper corrective steps in time to prevent costly production interruptions. Nondestructive testing can help you eliminate profit-draining equipment failures. -Investigate Magnaflux inspection methods today!





Zyglo inspection employs an oil base penetrant affect the service life of any metal part. Whether that is brilliantly flourescent under "black light". It detects surface cracks or pores when they may

you produce cutting tools, or use them, Zyglo provides better inspection at lower cost.

Take Your Inspection Problems to the House of Answers

MAGNAFLUX CORPORATION

7302 West Lawrence Avenue

Chicago 31, Illinois

New York 36 • Pittsburgh 36 • Cleveland 15 • Detroit 11 • Dallas 19 • Los Angeles 58



Production machine can handle toolroom work

Generally recognized as a high production machine this precision boring machine can also be arranged to handle toolroom work and short production runs. This flexibility is made possible with selective cycle equipment, a variable speed drive, and a universal fixture. The horizontal slide of the fixture is operated manually or hydraulically to suit work. A vertical slide can

be mounted parallel, or at right angles to the spindle, further adding to the setup flexibility possible to the machine. Changeovers from one job to another are quickly and easily accomplished. It has a maximum table travel of 12 in. and table feeds of ½ to 130 ipm; and rapid traverse of 38 fpm. Floor space: 76 x 69 in. Ex-Cell-O Corp.

For more data circle No. 42 on postcard, p. 113



Boom does normal, extra jobs without interference

Addition of this new custom-built boom to a standard rubber tire tractor has created a unit which is said to do double and triple duty. Now being used as a coal handler by a power & light company, it not only handles its normal job of dozing and pushloading scrapers but also does scattered maintenance and service work around the plant. The electrically operated boom functions without hampering nor-

mal dozer blade use. When not in use it folds out of the way. Extended it provides a crane which will lift a weight of three to four tons at a reach of 10 to 14 ft ahead. The boom is used for unloading 3000 lb. cylinders from railroad flat cars, loading and unloading heavy supplies from trucks, pipe handling and other things. LeTourneau-Westinghouse Co.

For more data circle No. 43 on postcard, p. 113



Drop Forgings

Made to your blueprints in many metals, in weights from ¼ to 15 pounds, depending on design. Accurate, smooth, and flash free. Their dense fibrous structure and controlled grain flow gives tremendous strength. Machined if desired.



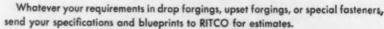
Upset Forgings

In a great variety of metals and alloys. High strength parts accurately produced —no flash, no blowholes. Excellent machining qualities.



Special Fasteners

Made to your specifications in any metal or alloy, ferrous or non-ferrous, ground or unground. Bolts to 2" diam., studs to 2½" diam. Fully dependable. Cut or precision rolled threads.





Exclusive New England Sale Agent for all products of

RHODE ISLAND TOOL COMPANY

SINCE 1834

144 WEST RIVER STREET, PROVIDENCE 1, R. I.

Continuous strip

This new, improved Hazelett continuous strip casting machine was unveiled recently. Metal can be cast on it from ½ to 1½ in. in thickness at an average speed of 20 fpm for the ½ in. product. Thicknesses of less than ½ in. can be cast but may not be practicable on a commercial scale, company admits, due to the difficulty in controlling the bath of molten metal at the high operating speed then required. Present machines are be-



ing made up to 26 in. wide; however, a 40 in. machine is now in the design stage. The next two machines built will also have greater accessibility to the bath by means of converging the upper casting belt toward the lower one at an angle of 60° instead of 20°. The machine was first tested by casting aluminum. Brass is now being experimentally cast. W. S. Rockwell Co.

For more data circle No. 44 on postcard, p. 113

End mill cutters

New end mill cutters just announced for aluminum and its alloys incorporate higher spiral flutes than conventional cutters.



This eases plunge cutting jobs. The mills also feature full end teeth for grinding of various radii. Polished flutes and faces aid ship flow. Goddard & Goddard Co.

For more data circle No. 45 on postcard, p. 113

THERMALLOY * quality control at work

private eye



We put the **eye** on your castings to cut heat-treat costs

Thermalloy castings such as pots and muffles are *completely* X-rayed throughout; other castings are X-rayed where experience has shown that abnormal conditions can be expected. All tests are conducted by trained radiographers.

X-ray testing is just one phase of Electro-Alloys research and quality control. Our Elyria plant has a completely equipped metallurgical laboratory for study of heat and abrasion problems encountered by our field engineers.

Let us put our facilities to work to solve your heat-treat problems. Call your local Electro-Alloys representative, or write for a copy of booklet T-225, Thermalloy Heat-Resistant Castings Give Longer Service Life. Electro-Alloys Division, 7018 Taylor Street, Elyria, Ohio.

*Reg. U. S. Pat. Off.—designating not just one but a group of alloys, each developed to meet a specific heat and abrasion problem.

Heat-Resistant Castings - Trays - Muffles - Retorts - Conveyor Belts - Radiant Tubes



ELECTRO-ALLOYS DIVISION
Elyria, Ohio

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WITH A HANNIFIN AIR PRESS

It's the ideal press for that occasional pressing job. These presses operate off ordinary shop air supply. They're fast and safe. Over 30 models to choose from...many for either bench or floor mounting. Capacities from ½ to 18 tons. Daylight to 46 inches...reach to 12 inches. Prompt delivery.



WRITE. Complete information and prices on Hannifin Air Presses will be sent on request.

6 Tons (Model B-2). One of more than 30 models. Press with base, \$519.

1-Ton Hand-D-Press. For small parts manufacturers. Press only, without valves, \$232.

Prices F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.



HANNIFIN

HANNIFIN CORPORATION, 513 S. WOLF ROAD, DES PLAINES, ILLINOIS



CATALOGS ON STAMPINGS & stamped assemblies, ARMED FORCES, BOX & CRATE and TRUNK HARDWARE.

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We couldn't begin to mention, in this limited space, all of the uses to which Diamond Perforated Metals are being applied today. In addition to the Sizing Screens and Ornamental Grilles, with which we started forty years ago, we now serve a great number of leading engineering and manufacturing organizations in such fast-moving fields as Air Conditioning, Atomic Energy, Aviation, Chemical Processing, Electronics, Noise Control, Smoke Abatement, Space Heating, etc.

To meet these widely diversified and constantly growing requirements we have developed hundreds of specialized tool arrangements which enable us to give superior service at competitive costs.

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DIAMOND MANUFACTURING CO Box 41 WYOMING PENNA

West Coast Plant, Diamond Perforated Metals Co 17915 So. Figueroa St., Gardena, Calif.

Granite surface plates

Seizure of gage blocks and checking fixtures, which has occasionally occurred when using granite surface plates, is said to have been eliminated. This is described as being done with a unique lapping method which provides a continuous bearing surface interspersed with micronic valleys. These minute reliefs report sufficient air pocket relief between bearing surfaces to prevent



seizure of instruments. The subdivisions of the grain pattern are so small as to be invisible to the naked eye. Plates are available in either two ledge or four ledge styles and are finished down to fifty millionths overall accuracy. Free souvenir desk weight, an exact replica of the company's black granite surface plates, is available on request. Collins Microflat Co.

For more data circle No. 46 on postcard, p. 113

New electric tractor

Drivers can couple and uncouple trailers without leaving their seat in a new electric tractor. Tractor pulls 3000 lb at drawbar. No-load speed is 7½ mph. Two front wheels steer through an inclined Ross cam and twin lever gear, minimizing road shock and steering effort. Wheel rims detach for quick tire



change without disturbing bearings. Drive consists of double-reduction spiral-bevel and spur-gear differential. Mercury Mfg. Co.

For more data circle No. 47 on postcard, p. 113

Compression tester

Built for testing aircraft wheel assemblies, this 500,000 lb capacity compression machine is designed so any one of three stages are instantly available without stopping. These are full, 1/5 and 1/20 capacity. Load is electronically indicated on a large illuminated 28 in. dial. The piston and cylinder



have been designed for installation in a pit. Thus, compression table is at floor level within easy reach of the operator. Motor controlled upper crosshead height is quickly adjusted by pushing a button on the control and indicating cabinet. This is separate from the loading unit. Tinius Olsen Testing Machine Co.

For more data circle No. 48 on postcard, p. 113

Hermetically sealed switch

One company's newest addition to its switch line promises to satisfy the requests of the airframe manufacturers by combining a hermetically sealed switch with the versa-



tility of rotary actuation. A new type seal, utilizing a silastic compound, has been formed to give flexibility without sacrificing the mechanical life requirements. Electro Snap Switch & Mfg. Co.

For more data circle No. 49 on postcard, p. 113

COWLES SLITTING KNIVES

Cut costs 3 ways

Cowles knives reduce set-up time. They are made so accurately they can be assembled on the arbor without shimming. Cowles knives stay on the job longer;—they reduce down-time for re-grinding; and produce straight edged strip with minimum burr avoiding tie-ups in blanking operations.



For maximum economy and satisfaction order your knives and spacers from Cowles, world's largest manufacturer of rotary slitting knives. Prompt delivery. Complete range of sizes and analyses for slitting high and low carbon steels, stainless, alloys, silicon or non-ferrous metals.

Engineering Assistance On Any Slitting Job!

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ROTARY SLITTING KNIVES . SPACING COLLARS . GANG TOOLS . EDGING ROLLS . CUT-OFF KNIVES . SEAM GUIDE ROLL FINS . SEAM GUIDES . WIRE DRAWING TOOLS . STANDARD AND SPECIALLY ENGINEERED TOOLS FOR ALL FERROUS AND NON-FERROUS PROCESSING, TRIMMING AND FORMING REQUIREMENTS.



HOIST & CRANE CO.

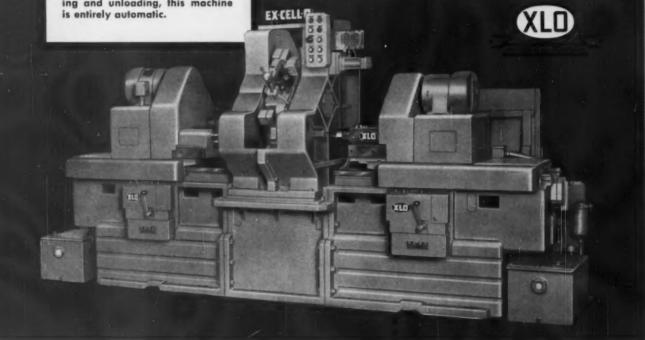
851 63rd Street, Brooklyn 20, N. Y.

New Ex-Cell-O 2-Way Machine

speeds gear case production, lowers cost . . .

ABOVE: Gear case after machining. Hole sizes are held within .0005", centers .001".

BELOW: New Style 54-A Precision Two-Way Machine equipped to bore and chamfer cast-iron gear cases. Except for loading, clamping and unloading, this machine is entirely automatic.



Typical of Ex-Cell-O's constant improvement in the field of precision production is this new Style 54-A Two-Way Precision Boring Machine.

Operations on the cast-iron gear case illustrated include finish boring seven holes and chamfering diameters at two points. With its new hydraulic control panel each way unit has a greater range of feeds and a higher rate of rapid traverse.

Like all standard Ex-Cell-O Machines, the new 54-A is easily adapted at slight cost to a variety of precision setups. For further information, contact the Ex-Cell-O representative in your area, or write, wire or phone direct to Ex-Cell-O, Detroit.

EX-CELL-0

CORPORATION

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS RAIROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT



The Iron Age SUMMARY...

Steel ingot production is approaching pre-strike levels . . . But after-effects of walkout will be felt for months . . . European consumers affected . . . Production outlook.

Broad Impact . . . Steel ingot production moved to within shooting distance of pre-strike levels this week. But the effects of strike losses will be felt for months to come and over a broad area, including Europe.

Before the walkout, mills had accepted orders for export to bolster an expected letdown in third quarter. But the strike knocked their calculations into a cocked hat. And European consumers won't get the steel they had counted on. Not for a while, at least.

In the weeks ahead, U. S. producers will be hard-pressed to accommodate domestic consumers. The strike loss of 11-12 million ingot tons shorted even those consumers who went into the walkout with comfortable inventories.

To make matters worse, producers are running into melting and rolling maintenance problems. A large plate mill in the midwest will be out of production for about a week. Roof caveins in openhearths and breakdown of blast furnace linings are compounding the problem.

Production Outlook . . . Despite all the problems growing out of the strike, production this year will equal the 111.6 million tons produced in 1953, but will be far short of last year's record 117 million tons.

Post-strike industrial slowdowns and shutdowns show signs of mounting. After-effects have hit a broad cross-section of industry, including farm equipment, construction, and freight car building.

Efforts to replenish shortages and rebuild inventories will keep the steel production rate at high level for balance of the year and beyond. It will be late in the year before mills can effect material reduction in backlogs and carryovers.

Coal Labor . . . Meanwhile, producers are concerned over the ominous silence of John L. Lewis, veteran leader of the United Mine Workers. Mr. Lewis is certain to ask for as much—or more—than his protege, Dave McDonald, got for the steel workers. And he has the power to shut down the steel industry's captive mines to enforce his demands. At any rate, higher coal-producing costs are a certainty.

Despite efforts of the mills to hold prices in check, the steel scrap market shows little sign of losing its post-strike steam. Markets generally continued to advance and the expected leveling off is not yet in sight.

Steel Output, Operating Rates

Steel Output, O	reruin	ig Kar	62	
Production	This Week	Last Week	Month Ago	Year
(Net tons, 000 omitted)	2,117	1,427	369	2,173
Ingot Index				
(1947-1949=100)	131.8	88.9	22.9	135.4
Operating Rates				
Chicago	91.0	80.0*	6.0	95.0
Pittsburgh	91.0	55.0*	6.0	95.0
Philadelphia	79.0	66.0	0.0	87.0
Valley	75.0	60.0	13.0	92.0
West	90.0	40.0	24.0	96.5
Detroit	77.0	43.0	52.0	89.0
Buffalo	95.0	63.5	0.0	0.001
Cleveland	94.0	52.0*	0.0	98.0
Birmingham	60.0	11.0	3.5	70.0
S. Ohio River	88.0	73.0*	73.0	90.5
Upper Ohio R.**	98.0	73.0*	55.5	99.0
St. Louis	102.0	96.0	84.0	96.0
Northeast	55.0	55.0	47.0	93.5
Aggregate	86.0	58.0	15.0	90.0

*Revised **See page 176

Prices At A Glance

		63 M	-	
(cents per lb unless otherwise	noted)			
	This	Week	Month	Year
	Week	Ago	Ago	Ago
Composite price				
Finished Steel, base	5.597	¢ 5.374	* 5.179	5.174
Pig Iron (Gross Ton)	\$63.15	\$62.95	\$60.61	\$59.09
Scrap, No. 1 hvy				
(gross ton)	\$56.83	\$55.50	\$46.50	\$43.83
Nonferrous				
Aluminum ingot	25.90	25.90	25.90	23.20
Copper, electrolytic	46.00	46.00	46.00	36.00
Lead, St. Louis	15.80	15.80	15.80	12.50
Magnesium	34.50	34.50	34.50	29.25
Nickel, electrolytic	64.50	64.50	64.50	67.67
Tin, Straits, N. Y.	98.625	100.25	96.125	96.50
Zinc, E. St. Louis	13.50	13.50	13.50	12.50
* Revised				

Prices Up As Capital Watches

Producers from East to West Coast lift carbon and alloy steel product prices . . . Govt. disturbed about inflation, sees no immediate spiral . . . Warehouse freeze order lifted.

• THE TIDAL WAVE of price increases on carbon and alloy steel products came this week as Washington kept a wary eye on their inflationary currents.

Producers from East to West Coast announced new price schedules covering plate, bar, sheet, strip, wire and structurals. Also up were pipe and tubing, clad steel, tool steel, electrical sheets, merchant wire products, rail and track supplies and boiler tubes.

Other industry products which joined the upswing were pig iron, coke, and stainless steels. (For new prices see IRON AGE tables beginning on page 149.)

These price increases, the Eisenhower administration feels, contain the seeds of inflation, although the President is not yet too worried about an immediate price spiral.

The steel price hike, according to the Chief Executive, "holds up the danger of inflation," and the Administration is watching the situation "very closely," on a dayby-day basis.

Although there are no plans at present for the government to take any steps to combat inflation, Eisenhower's aides are watching to see that the price hike doesn't upset the Administration's efforts to keep the dollar stable, at least through elections in November.

Also from Washington comes word that the steel warehouse freeze order has been revoked and that steel mills are authorized to reschedule shipments on defense orders retarded by the work stop-

Revocation of the "freeze" order invoked in July on steel warehouses by the Business and Defense Services Administration, U. S. Department of Commerce, took effect on August 13, 1956.

by settlement of the steel strike.

Direction 8, issued to protect orders of defense contractors for steel products, established limitations on weekly shipments by distributors for non-defense orders. Such limitations were made applicable only in respect to a distributor's supply of specified steel products when his inventory had reached 50 pct of his June 30 inventory.

BDSA said that on and after August 13 it is unnecessary for distributors of the specified steel products to observe the limitations.

Steel producers having defense orders calling for delivery on or before August 31, 1956, were instructed by the Business and Defense Services Administration, U. S. Department of Commerce, to make shipments against such orders as soon as practicable, but not later than September 30, 1956.

BDSA said this means that the steel producers are authorized to schedule production and delivery of these orders in any sequence they choose, provided the ship-

The action revoking Direction 8 to Defense Materials System Regulation 1 was made possible

Purchasing Agent's Checklist

SPECIAL REPORT: How to avoid the pitfalls in product diversificationp. 51

TRANSPORTATION: Freight car shortage will hurt this fall ... p. 56

PRODUCTION: Metal lath makers battle competition p. 58

MARKETING: Industrial truck and tractor sales are goodp. 62 ments are completed by the end of next month.

To the extent that a producer is unable to make shipment by the end of September, he is instructed by Direction 9 to Defense Materials System Regulation 1, effective Aug. 10, to notify the BDSA Iron and Steel Division promptly by letter or telegram, listing the defense orders he is unable to fill within the prescribed time.

The purpose of this change in the rules is to assure maximum steel production with the resumption of operations, with minimum impact on deliveries against defense orders.

Price increase announcements not listed in IRON AGE price tables include:

U. S. Steel Products Div. of U. S. Steel Corp. issued new prices at certain producing points effective Aug. 13 on its line of steel drums and pails. The revisions represent an average increase of approximately 10 pct.

Latrobe Steel Co. announced a price raise of 8 cents per lb on base prices of high speed steels. There is also an 8 pct increase on extras. The company is also raising other tool steels by 5 pct on base and extras.

National Electric Products Corp., a manufacturer of electrical distribution systems and accessories, announced increases ranging from 5 to 7.7 pct on all types of rigid conduit.

Northeastern Steel Corp. increased foundry coke, f.o.b. Everett, by \$2.00 per ton effective Auggust 15. The new price is \$30.55 per net ton.

Allegheny Ludlum Steel Corp. announced it is increasing the base prices of its electrical alloy grades effective August 9. Extras on these products are being increased by approximately 61/4 pct.

Base prices on high temperature high strength "superalloys" were also increased by Allegheny Ludlum by approximately 8 pct.

The United States Steel Export Company announced new export price bases effective August 8th. They reflected, the company stated, the changed domestic prices announced earlier by U.S. Steel Corp. and its operating divisions.

Comparison of Prices

Aug. 15, 1956)

Price advances over previous	week are	printed	in Heav;	Type:	Pig Iron: () Foundry,
eclines appear in Italics.					Foundry,
	Aug. 14	Aug. 7	July 17	Aug. 16	Foundry,
Plat-Rolled Steel: (per pound)	1956	1956	1956	1955	Foundry,
Hot-rolled sheets	4.675¢	4 884	4 0004	4 5554	Foundry,
Cold-rolled sheets		4.51¢	4.825€	4.325¢	Basic del'
Galvanized sheets (10 ga.)	5.75	5.431	5.325	5.325	Basic, Va
Hot-rolled strip	6.30	5.85	8.85	5.85	Malleable,
Hot-rolled strip	4.668	4.469	4.825	4.325	Malleable,
Cold-rolled strip	6.883	6.84	6.28	6.29	Ferroman
Plate	4.87	4.61	4.52	4.52	74 to 76
Plates, wrought fron	10.40	10.40	10.40	9.30	
Stainl's C-R strip (No. 802)	47.50	44.50	44.50	44.50	Die Iser Co
Pin and Wassell-to- /					Pig Iron Co
in and Terneplate: (per base bo					Lift 1LOB
Tinplate (1.50 lb.) cokes	\$9.85	\$9.85	89.85	89.05	
Tinplates, electro (0.50 lb.)	8.55	8.55	8.55	7.75	Scrap: (per
Special coated mfg. ternes	9.10	9.10	9.10	7.85	No. 1 ste
han and 614 (n					No. 1 ste
Bars and Shapes: (per pound)					No. 1 ste
Merchant bars	5.075¢	4.825¢	4.65€	4.65¢	No. 1 but
Cold finished bars	6.85	5.90	5.90	5.90	Low phos
Alloy bars	6.125	5.65	5.65	5.65	No. 1 ma
Structural shapes	5.00	4.87	4.60	4.60	No. 1 ma
Stainless bars (No. 302)	40.75	38.25	38.25	88.25	No. 1 ma
Wrought iron bars	11.50	11.50	11.50	10.40	240. 3 1110
Vire: (per pound)					Steel Scrap
Bright wire	7.20¢	6.60¢	6.60€	6.25¢	No. 1 hea
Rails: (per 100 lb.)					0.1. 0
Heavy rails	\$5,075	\$4.90	84,725	84,725	Coke, Conn
Light rails	6.00	5.65	5.65	5.65	Furnace
	0.00	0.00	0.00	0.00	Foundry
Semifinish Steel: (per net ton)					
Rerolling billets	\$74.00	868.50	\$68,50	\$68.50	Nonferrous
Slabs, rerolling	74.00	68.50	68.50	68.50	Copper, e
Forging billets	91.50	84.50	84.50	84.50	Copper,
Alloy blooms, billets, slabs	107.00	96.00	96.00	96.00	Tin, Stra
					Zinc, Eas
Wire Red and Skelp: (per pound)					Lead, St.
Wire rods	5.80¢	5.025€	5.025é	5.025é	Aluminur
Skelp	4.225	4.225	4.225	4.225	Nickel, el
					Magnesiu

	Aug. 14 1956	Aug. 7 1956	July 17 1956	Aug. 1
Pig Iron: (per gross ton)				
Foundry, del'd Phila	\$67.76	\$66.51	\$65.26	\$63.69
Foundry, Valley	63.00	63.00	60.50	59.00
Foundry, Southern Cin'ti		62.98	62.93	62.93
Foundry, Birmingham	59.00	57.67	57.67	85.00
Foundry, Chicago	63.00	63.00	60.50	59.00
Basic del'd Philadelphia	66.98	65.78	64.48	62.77
Basic, Valley furnace	62.50	62.50	60.00	58.50
Malleable, Chicago	63.00	63.00	60.50	59.00
Malleable, Valley	63.00	68.00	60.50	59.00
Ferromanganese, cents per lb.1	10.75¢	10.75€	9.50¢	9.50
74 to 76 pct Mn base.				
Pig Iron Composite: (per gross to	on)			
Pig iron		\$62.95	\$60.61	\$59.09
Serap: (per gross ton)				
No. 1 steel, Pittsburgh	357.50	\$56.50	\$46.50	\$44.50
No. 1 steel, Phila, area	56.50	54.50	48.50	46.50
No. 1 steel, Chicago		55.50	44.50	40.50
No. 1 bundles, Detroit		51.50	39.50	38.50
Low phos., Youngstown	65.50	61.50	52.50	46.50
No. 1 mach'y cast, Pittsburgh.		59.50	54.50	44.50
No. 1 mach'y cast, Philadel'a	57.50	57.50	54.50	46.50
	01100	59.50	47.50	52.50
No. 1 mach'y cast, Chicago	59.50	89.80	41.00	02120
No. 1 mach'y cast, Chicago		09.00	41.00	-
No. 1 mach'y cast, Chicago	es ton)	\$55.50	\$46.50	\$48.88
No. 1 mach'y cast, Chicago Steel Scrap Composite: (per grc No. 1 heavy melting scrap Coke, Connellsville: (per net to	es ton) \$56.83	\$55.50	\$46.50	\$48.88
No. 1 mach'y east, Chicago Steel Scrap Composite: (per gre No. 1 heavy melting scrap Coke, Connellsville: (per net to Furnace coke, prompt	es ton) \$56.83 n at oven) \$14.50	\$55.50 \$14.50	\$46.50 \$14.50	\$48.83 \$13.25
No. 1 mach'y cast, Chicago Steel Scrap Composite: (per green No. 1 heavy melting scrap Coke, Connellsville: (per net to	es ton) \$56.83 n at oven) \$14.50	\$55.50	\$46.50	\$48.83 \$13.25
No. 1 mach'y cast, Chicago Steel Scrap Composite: (per gro No. 1 heavy melting scrap Coke, Connellaville: (per net to Furnace coke, prompt Foundry coke, prompt Nonferrous Metals: (cents per p	es ton) \$56.83 n at oven) \$14.50 17.50 ound to la	\$55.50 \$14.50 17.50	\$46.50 \$14.50 17.50	\$48.88 \$13.25 16.25
No. 1 mach'y cast, Chicago Steel Scrap Composite: (per gre No. 1 heavy melting scrap Coke, Connellsville: (per net to Furnace coke, prompt Foundry coke, prompt Nonferous Metals: (cents per p Copper, electrolytic, Conn	es ton) \$56.83 n at oven) \$14.50 17.50 ound to la	\$14.50 17.50 rge buyer \$40.00*	\$46.50 \$14.50 17.50	\$48.88 \$13.25 16.25
No. 1 mach'y east, Chicago Steel Serap Composite: (per gro No. 1 heavy melting scrap Coke, Connellaville: (per net to Furnace coke, prompt Foundry coke, prompt Nonferrous Metals: (cents per p Copper, electrolytic, Conn Copper, Lake, Conn	es ton) \$56.83 n at oven) \$14.50 17.50 ound to la \$40.00 40.00	\$14.50 17.50 rge buyer \$40.00*	\$46.50 \$14.50 17.50 18) \$46.00 46.00	\$13.25 16.25 \$36.00 \$6.00
No. 1 mach'y cast, Chicago Steel Scrap Composite: (per gre No. 1 heavy melting scrap Coke, Connellsville: (per net to Furnace coke, prompt Foundry coke, prompt Nonferrous Metals: (cents per p Copper, electrolytic, Conn Copper, Lake, Conn Tin, Straits, New York	es ton) \$56.83 n at oven \$14.50 17.50 ound to la \$40.00 40.00 98.625†	\$14.50 17.50 rge buyer \$40.00* 40.00* 100.25	\$46.50 \$14.50 17.50 \$46.00 46.00 96.125	\$48.88 \$13.25 16.25 \$36.00 96.50
No. 1 mach'y cast, Chicago Steel Scrap Composite: (per gro No. 1 heavy melting scrap Coke, Connellaville: (per net to Furnace coke, prompt Foundry coke, prompt Nonferrous Metals: (cents per p Copper, electrolytic, Conn. Copper, Lake, Conn. Tin, Straits, New York Zine, East St. Louis	es ton) \$56.83 n at oven) \$14.50 17.50 ound to la \$40.00 98.625† 13.50	\$14.50 17.50 rge buyer \$40.00* 40.00* 100.25 13.50	\$46.50 \$14.50 17.50 18,46.00 46.00 96.125 13.50	\$13.25 16.25 \$36.00 96.50 12.50
No. 1 mach'y east, Chicago Steel Scrap Composite: (per gre No. 1 heavy melting scrap Coke, Connellsville: (per net to: Furnace coke, prompt Foundry coke, prompt Nonferrous Metals: (cents per p Copper, electrolytic, Conn Copper, Lake, Conn Tin, Straits, New York Zinc, East St. Louis	at oven) \$14.50 17.50 1840.00 98.625† 18.50	\$14.50 17.50 rge buyer \$40.00* 40.00* 100.25 13.50 15.89	\$46.50 \$14.50 17.50 17.50 \$46.00 96.125 13.50 15.80	\$48.88 \$13.25 16.25 \$36.00 96.50 12.500
No. 1 mach'y east, Chicago Steel Scrap Composite: (per gro No. 1 heavy melting scrap Coke, Connellaville: (per net to Furnace coke, prompt Foundry coke, prompt Nonferrous Metals: (cents per p Copper, electrolytic, Conn. Copper, Lake, Conn. Tin, Straits, New York Zinc, East St. Louis Lead, St. Louis Aluminum, virgin ingot	ston) \$56.83 n at oven) \$14.50 17.50 ound to la \$40.00 40.00 98.625† 13.50 15.80 25.90	\$14.50 17.50 rge buyer \$40.00* 40.00* 100.25 13.50 15.89 25.90	\$46.50 \$14.50 17.50 w) \$46.00 46.00 96.125 13.50 15.80 25.90	\$13.25 16.25 336.00 96.50 12.50 14.80 23.20
No. 1 mach'y cast, Chicago Steel Scrap Composite: (per gre No. 1 heavy melting scrap Coke, Connellsville: (per net to: Furnace coke, prompt Foundry coke, prompt Nonferrous Metals: (cents per p Copper, electrolytic, Conn Copper, Lake, Conn Tin, Straits, New York Zinc, East St. Louis Aluminum, virgin ingot Nickel. electrolytic	at oven \$14.50 17.50 17.50 18.40.00 40.00 98.625† 13.50 15.80 25.90 64.50	\$14.50 17.50 rge buyer \$40.00* 40.00* 100.25 13.50 15.80 25.90 64.50	\$46.50 \$14.50 17.50 8) \$46.00 46.00 96.125 13.50 15.80 25.90 64.50	\$48.83 \$13.25 16.25 \$36.00 96.50 12.50 14.80 23.20 67.67
No. 1 mach'y cast, Chicago Steel Scrap Composite: (per gre No. 1 heavy melting scrap Coke, Connellsville: (per net to: Furnace coke, prompt Foundry coke, prompt Nonferrous Metals: (cents per p Copper, electrolytic, Conn Copper, Lake, Conn Tin, Straits, New York Zinc, East St. Louis Aluminum, virgin ingot Nickel. electrolytic	at oven \$14.50 17.50 17.50 18.40.00 40.00 98.625† 13.50 15.80 25.90 64.50	\$14.50 17.50 rge buyer \$40.00* 40.00* 100.25 13.50 15.89 25.90	\$46.50 \$14.50 17.50 17.50 18.60 46.00 96.125 13.50 15.80 25.90 64.50 84.50	\$48.83 \$13.25 16.25 \$36.00 96.50 12.50 14.80 23.20 67.67 29.25
No. 1 mach'y east, Chicago Steel Scrap Composite: (per gro No. 1 heavy melting scrap Coke, Connellaville: (per net to Furnace coke, prompt Foundry coke, prompt Nonferrous Metals: (cents per p Copper, electrolytic, Conn. Copper, Lake, Conn. Tin, Straits, New York Zinc, East St. Louis Lead, St. Louis Aluminum, virgin ingot	se ton) \$56.83 at oven) \$14.50 17.80 ound to la \$40.00 40.00 98.625† 13.50 15.80 25.90 64.50 34.50 33.60	\$14.50 17.50 rge buyer \$40.00* 40.00* 100.25 13.50 15.80 25.90 64.50	\$46.50 \$14.50 17.50 8) \$46.00 46.00 96.125 13.50 15.80 25.90 64.50	\$13.25 16.25 336.00 96.50 12.50 14.80 23.20

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, ralls, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Phila-delphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite
Average of No. 1 heavy melting steel scrap
delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON Deliars per gross ton, f.o.b., subject to switching charges.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill.

Producing Point	Basic	Fdry.	Mall.	Beas.	Low Phos.	Product	291
Bethlehem B3	64.50	65.00	65.50	66.00		Ingota, reroll.	19.75
Birdsboro, Pa. B6	64.50	65.00	65.50	66.00			
Birmingham R3 Birmingham W9	58.50	59.00		++***		Slabs, billets, reroll.	24.50
Birmingham U4.	58,50 58,50	59.00 59.00	63.00	*****		m	
Buffalo R3	62,50	63.00			******	Billets, forging	-
Buffalo HI	62.50	63.00	63.50 63.50	64.00			
m # 1 11//	64.50	65.00	65.50	66.00	******	Bars, struct.	-
Chester C/7	62,00	62.50	63.00		******	Plates	-
Chicago 14	62.50	63.00	63.00	63.50		Printes	-
Cleveland A5	62.50	63.00	63.00	63,50	67.50	Sheets	45.00
Cleveland R3	62.50	63.00	63.00	63,50		O SHEETS	40.00
Dellas L3		55.00	00.00	60.00	******	Strip, het-relled	33.00
Dubuth 14	62.50	63.00	63.00	63.50	67.501	Surp, not-rened	33.90
Eria 14	62.50	63.00	63,00	63.50	67.501	Strip, cold-rolled	31.50
Everett Aff		63.75	64.25	-		y,	0.00
Fontana K1	79.00	70.50				Wire CF: Red HR	
Geneva, Uah C7.	60.00	60.50		13.000			
Granite Ci y G2	64.40	64.90	65,40				
Hubbard Y/			63,00				
Midland C//	60.00						
Minnequa C6	64.50	65,00	65.50			CTAINI PCC CTCCI DO	OPTION
Monesson P6	60.00					STAINLESS STEEL PR	UDUCI
Neville Is. P4	62.50	63,00	63.00	63.50	67.501	Sheets: Midland, Pa., C	711: Bra
N. Tonawanda TI		63.00	63.50	64.00		lower on Type 430), J2; B	altimore
Pittsburgh U1	62.50		63.00	63.50		Ind., 12; Ft. Wayne, 14;	Philadel
Sharpaville 53	62.50	63.00	63.00	63.50			
So. Chicago R3	62.50	63.00	63.00			Strip: Midland, Pa., Cl	
Steel on B3	64.50	65.00	65.50	66.00	70.50	ington, Pa., W2; W. Leecl	
Swedeland A2	64.50	65.00	65.50	65.50		Youngstown, C5; Sharon,	
Toledo If	62.50	63.00	63.00	63.50	VASTAGE 1	New Bedford, Mass., R6;	Gary,
Troy, N. Y. R3	64.50	65.00	65.50	66.00	70.50	Bar: Baltimore, A7; S.	Duques
Youngstown YI	62.50	63.00	63.00	63.50	******	J2; McKeesport, Pa., UI,	FI: Bri

	1	1			1	
DIFFERENTIAL						
silicon or portion	thereof o	over base	(1.75 to	2.25	ct ex	ept
low phos., 1.75 t						
manganese or po						
0.5 to 0.75 pct nic						
* Add \$1.00 for 0.						
Silvery Iren:	Ruffala	HI \$7	2.50 · In	ckeen.	H	14.

Silvery Iron: Buffale, H, \$72.56; Jackson, JI, Id. \$71.00. Add \$1.25 per ton for each \$0.50 pct allicon over base (6.01 to 6.50 pct) up to 14 pct. Add 75c for each \$6.50 pct manganese over 1.0 pct. Bessemer ferresilican: \$44.00.

Product	291	202	301	302	303	304	316	321	348	410	416	430
Inguta, reroll.	19.75	21.00	20.50	22.60		23.25	35.25	28.25	37.50	16.00	27.75	16.25
Slabs, billets, reroll.	24.50	27.25	25.25	28.00	28.50	29.25	41.50	35.75	47.50	29.75	-	21.00
Billets, forging	-	33.00		34.00	37.00	36.00	56.25	42.25	56.00	27.25	-	27.75
Bars, struct.	-	39.25	40.50	40.75	43.75	43.00	66.75	50.25	66.00	32.50	33.00	33.00
Plates	-	41.25	-	43.00	-	45.75	70.25	54.50	71.00	33.75	-	34.50
Sheets	45.00	45.25	47.25	47.50	-	50.25	74.75	60.00	80.25	38.75	-	39.25
Strip, hot-relled	33.00	35.75	34.00	36.75	-	39.75	63.50	48.75	65.25	29.75	-	30.75
Strip, cold-rolled	31.50	45.25	43.75	47.50	-	50.25	74.75	60.00	80.25	38.75	-	39.25
Wire CF: Red HR	-	-	38.50	38.75	41.75	41.00	63.75	48.00	63.00	31.00	31.50	31.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., C11; Brackemidge, Pa., A3; Butler, Pa., A7; Vandergrift, Pa., U1; Washington, Pa., W2 (2.25¢ lower on Type 430), J2; Baltimore, E1; Middletown, O., A7) Massillon, O., R3; Cary, U1; Bridgeville, Pa., U2; New Castle, Ind., I2; Ft. Wayne, J4; Philadelphia, D5.

Strip: Midland, Pa., Cl1; Waukegan, Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Leechburg, Pa., A3; Bridgeville, Pa., U2; Detroit, M2; Canton-Massillon, O., R3; Harrison, N. J., D3; Youngstown, C5; Sharon, Pa., S1; Butler, Pa., A2; Wallingford, Conn., U3 (.25¢ per lb higher); W1 (.25¢ per lb higher); New Bedford, Mass., R6; Gary, U1 (.25¢ per lb higher).

Bar: Baltimore, A7; S. Duquesse, Pa., U1; Mushall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; S. Chicago, U1; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, A5; Canton, O., T5; Ft. Wayne, I4; Philadelphia, D5; Detroit, R5; Gary, U1.

Wire: Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monessen, P1; Syracuse, C11; Bridgeville, U2.

Structurals: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11; S. Chicago, U1.

Plates: Brackenridge, Pa., 43; Chicago, UI; Munhall, Pa., UI; Midland, Pa., CII; New Castle, Ind., 12; Middletown, 47; Washington, Pa., J2; Cleveland, Massillon, R3; Coatesville, Pa., CI5; Philadelphia, D5; Vandergrift, Pa., UI; Gary, UI. Forged discs, die blacks, rings: Pittsburgh, C11; Syracuse, C11; Ferndale, Mich., A3; Washington, Pa., J2.

Forgings billets: Midland, Pa., C11; Baltimore, A1; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11; Detroit, R5; Munhall, Pa., S. Chicago, U1.

Scrap Cracks Price Record

Iron Age composite hits new high... Mills are trying to hold level, but with little success... Threatening iron ore shortage aggravates scrap supply picture.

• BEST EFFORTS of steel mills to contain the surging scrap market failed to halt the upward climb of scrap prices.

Increases in most market areas sent THE IRON AGE composite price up another \$1.33 from last week's record tying level to a new all-time high of \$56.83.

Only a few signs of leveling prices were noted and in some markets higher prices were expected. Brokers' buying in many cases sent prices up in spite of refusal of major consumers to enter the market.

Whether prices hold or continue higher depends on consumer ability to hold off from big purchases. However, in some areas scrap is flowing freely at current prices, indicating that established prices there are able to draw out sufficient tonnages of scrap.

Another factor contributing to the bullish tendency of the market is a threatened shortage of iron ore. Because of a strike on the Lakes fleet of the biggest carrier, the ore supply situation is not encouraging for a long winter of full steelmaking operations. If the strike continues for any length of time, blast furnace grades are expected to soar even higher. The effect on steelmaking grades will also be inflationary.

Against these factors, mills are playing it tight, brokers are paying higher than mill quoted figures to cover old orders. One stabilizing factor — dealers are improving collections, may be more willing to sell at current prices, or near that point.

Pittsburgh . . . Mills continue to resist higher prices and there is talk that dealers may be forced to turn more scrap loose at reduced figures.

However, there are also reports that one major mill is considering a purchase of No. 1 heavy melting that is in line with current broker buying levels. If the mills can hold out long enough, they may be able to turn the market. But if a major consumer has to enter the market soon, it will be for prices well over the last mill purchase. Final railroad lists advanced grades \$1 to \$3. Cast prices are up \$1 to \$2.

Chicago . . . Leveling of the market continued although industrial grades continued to advance and electric furnace grades to show marked strength. Major mills had not moved on new purchases, but the general tone is strong with small mills moving material in quantity and with considerable local scrap moving out of the area. Spot sales to brokers at prices over consumer prices continued.

Prices for cut bolsters and side frames; angles and splice bars were incorrectly listed in Aug. 9 issue. Correct prices were \$67 to \$68; and \$72 to \$73 respectively.

Philadelphia . . . Rising market brought out additional tonnages though not in large amounts. Steelmaking grades jumped \$2 and blast furnace, premium, and railroad grades increased \$1 to \$3. Prices might take another jump if a major area mill starts active buying again. Vigorous export activity has helped maintain the current market level.

New York . . . On the basis of both export and domestic purchases, No. 1 heavy melting price increased \$1 to \$51. Although demand for No. 2 grades was not quite as strong as No. 1, there was enough pressure to push the price up \$1 to \$42. Collections continue to be slow with no indication of any improvement in store until September. Demand is steady. Increase in price is expected to help very little since problem is the usual seasonal drop.

Detroit . . . No. 1 grades advanced again this week on the basis of a local mill purchase. The same mill bought No. 2 bundles at an f.o.b. price \$5 under last week's quotation. The market continues to reflect a strong tone. Both dealers and brokers look for an upturn in blast furnace grades as mills begin to feel a shortage of iron ore.

Cleveland . . . A major consumer bought No. 1 steelmaking scrap at \$62.50 in Cleveland and \$65 in the Valley. As a result, No. 2 grades also moved up in sympathy. Railroad grades are also up \$1 to \$4 on the latest lists. Electric furnace and cast grades also made major advances. Only blast furnace grades held at previous levels.

Birmingham . . . Prices remain unchanged, with brokers having little difficulty in covering their limited openhearth orders which were placed at the first of the month by the area's two major consumers. Cast is still in strong demand, with prices firm.

St. Louis . . . Movement of scrap has stepped up as a result of higher prices now prevailing. Shippers are not holding back and mills are taking all that is offered. Rails are in strong demand and most grades showed price advances.

Cincinnati... On the basis of buying for a new mill order, price of No. 2 heavy melting is up \$2. No. 2 steelmaking grades are up \$1 to \$1.50 on the same purchase. On the basis of general buying, low phos 18 in and under also advanced. Scattered buying at even higher prices has been rumored for low phos. Railroad grades are up \$4, cast unchanged.

Buffalo . . . The market continues very strong with prices of primary grades advancing on the strength of roker buying and No. 2 grades on basis of mill purchases.

Boston . . . The market continues strong with both export and domestic activity holding the market firm. No. 2 grades also advanced in price while primary grades held steady on the basis of new purchases.

West Coast . . . Export activity continues to keep the market firm on the Coast. Resumption of steel production has helped strengthen demand. Shortage of cast has put some foundries on short work week.



Leaders in Iron & Steel Scrap Since 1889



For over half a century our experience, personnel, equipment and key office locations have contributed to the steady growth of the iron and steel industry. Possibly our facilities may help you solve a problem in Iron or steel scrap—no matter how big or small.







uria Brothers and Company, Inc.

main office PHILADELPHIA NATIONAL BANK BUILDING, Phila. 7, Pa.

LESANOS, PERMA. DETROIT (ECONSE), SEADINA, PERMA, DIC N I D & N MADENIA, PERMA, PITTSDEFOR PERMA

MAPORY & EXPORT - LIVINGSTON & SOUTHARD, INC., 99 Pork Ave., New York, N. Y. . Cable Address: FORENTRACO

Pittsburgh

No. 1 hvy. melting\$	57.00	to	\$58.00
No. 2 hvy. melting	49.00	to	50.00
No. 1 bundles	57.00	to	58.00
No. 2 bundles	45.00	to	46.00
Machine shop turn	36.00		37.00
Mixed borfl and ms. turn	36.00		37.00
Shoveling turnings	40.00		41.00
Cast iron borings	40.00		41.00
Low phos. punch'gs plate	67.00		68.00
Heavy turnings	50.00		51.00
No. 1 RR. hvy. melting	67.00		68.00
Scrap rails, random lgth	72.00		73.00
Rails 2 ft and under	75.00		76.00
RR. steel wheels	73.00		
RR. spring steel	73.00		
RR. couplers and knuckles	73.00		
No. 1 machinery cast	60.00		
Cupola cast	53.00		
Heavy breakable cast	51.00	to	52.00

Chicago

No. 1 hvy. melting	56.00	to	\$57.00
No. 2 hvy. melting	47.00		48.00
No. 1 factory bundles	64.00	to	65.00
No. 1 dealers' bundles	57.00	to	58.00
No. 2 dealers' bundles	43.00	to	44.00
Machine shop turn	33.00	to	34.00
Mixed bor, and turn	35.00	to	36.00
Shoveling turnings	35.00	to	36.00
Cast iron borings	35.00	to	36.00
Low phos. forge crops	72.00	to	73.00
Low phos. punch'gs plate	69.00	to	70.00
Low phos. 3 ft and under	67.00	to	68.00
No. 1 RR. hvy. melting	62.00	to	63.00
Scrap rails, random lgth	72.00		
Rerolling rails	83.00	to	
Rails 2 ft and under	81.00	to	
Locomotive tires, cut	67.00		
Cut bolsters & side frames	67.00		
Angles and splice bars	72.00		
RR. steel car axles	80.00		
RR. couplers and knuckles	66.00		
No. 1 machine cast	59.00		
Cupola cast	55.00		
Heavy breakable cast	48.00		
Cast iron brake shoe	49.00		
Cast iron wheel	60.00		
Malleable	72.00		
Stove plate	50.00		
Steel car wheels	68.00	to	69.00

Philadelphia Area

i minancibina viica			
No. 1 hvy. melting	56.00	to	\$57.00
No. 2 hvy. melting	46.00		
No. 1 bundles	56.00	to	57.00
No. 2 bundles	44.00	to	45.00
Machine shop turn	37.00	to	38.00
Mixed bor, short turn,	37.00	to	38.00
Cast iron borings	39.00	to	40.00
Shoveling turnings	42.00	to	43.00
Clean cast chem. borings	42.00		
Low phos. 5 ft and under	58.00		
Low phos. 2 ft and under	60.00		
Low phos. punch'gs	60.00		
Elec. furnace bundles	58.00		
Heavy turnings	52.00		
RR. steel wheels	66.00		
RR. spring steel	63.00		
Rails 18 in. and under	70.00		
Cupola cast.	53.00		
Heavy breakable cast	54.00		
Cast iron car wheels	62.00		
Malleable	67.00		
Unstripped motor blocks	35.00		
No. 1 machinery cast	57.00	to	58.00

Cleveland

No. 1 hvy. melting	\$61.50	to	\$62.50
No. 2 hvy. melting	47.00		
No. 1 bundles	61.50		
No. 2 bundles	40.00		
No. 1 busheling			
Machine shop turn	32.50		
Mixed bor, and turn	38.00		
Shoveling turnings	38.00		
Cast iron borings	38.00		39.00
Cut struct'r'l & plates, 2 ft	00,00		80.01
& under	67.00	to	68.00
Drop forge flashings	62.50		63.50
Low phos. punch'gs, plate.			63.50
Foundry steel, 2 ft & under			57.00
No. 1 RR. heavy melting	66.00		67.00
Rails 2 ft and under	79.00		80.00
Rails 18 in. and under	80.00		81.00
Railroad grate bars	47.00		48.00
Steel axle turnings	44.00		45.00
Railroad cast			60.00
No. 1 machinery cast	57.00		58.00
Stove plate			54.00
Malleable	69.00		70.00
AMERICAN STREET, STREE	00.00	w	10.01

Iron and Steel Scrap

Going prices of Iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	34.00 to \$65.	00
No. 2 hvy, melting	17.00 to 48.	00
No. 1 bundles	64.00 to 65.	.00
No. 2 bundles	13.00 to 44.	
Machine shop turn	34.00 to 35.	
Shoveling turnings	39.00 to 40.	
Cast iron borings	39.00 to 40.	
Low phos. plate	65.00 to 66	.00

Burraio			
No. 1 hvy. melting	54.00	to	\$55.00
No. 2 hvy. melting	43.00	to	44.00
No. 1 busheling	54.00	to	
No. 1 bundles	54.00	to	55.00
No. 2 bundles	40.00	to	
Machine shop turn	30.00		
Mixed bor. and turn	32.00		
Shoveling turnings	34.00		
Cast iron borings	32.00		
Low phos. plate	55.00		
Scrap rails, random lgth	57.00		
Rails 2 ft and under	65.00		
RR. steel wheels	60.00		
RR. spring steel	60.00		
RR. couplers and knuckles	62.00		
No. 1 machinery cast	52.00		
No. 1 cupola cast	50.00	to	51.00

Detroit

Deliali			
Brokers buying prices per gree	s ton,	on	cars
No. 1 hvy. meltitng	53.00	to \$	54.0
No. 2 hvy. melting	41.00	to	42.0
No. 1 bundles, openhearth.			55.0
No. 2 bundles	35.00	to	36.0
New busheling		to	54.0
Drop forge flashings	52.50	to	53.5
Machine shop turn		to	30.0
Mixed bor, and turn,			33.0
Shoveling turnings	32.00	to	33.0
Cast iron borings	32.00	to	33.0
Low phos. punch'gs, plate.	53.00	to	54.0
No. 1 cupola cast	51.00	to	52.0
Heavy breakable cast			45.0
Stove plate	45.00	to	46.0
Automotive cast	54.00	to	55.0

St. Louis

JI. BOMIS		
No. 1 hvy. melting	\$51.00 to	\$52.00
No. 2 hvy. melting	42.00 to	43.00
No. 1 bundles	50.00 to	51.00
No. 2 bundles	38.00 to	39.00
Machine shop turn	32.00 to	33.00
Cast iron borings	33,00 to	34.00
Shoveling turnings	33.00 to	34.00
No. 1 RR. hvy. melting	61.50 to	62.50
Rails, random lengths	75.00 to	76.00
Rails 18 in, and under	75.00 to	76.00
Locomotive tires uncut	62.00 to	63.00
Angles and splice bars	64.00 to	65.00
Std. steel car axles	76.00 to	77.00
RR. specialties	65.00 to	66.00
Cupola cast	54.00 to	55.00
Heavy breakable cast,	45.00 to	46.00
Cast iron brake shoes	50.00 to	
Stove plate	48,00 to	
Cast iron car wheels	53,00 to	
Rerolling rails	78.00 to	
Unstripped motor blocks	44.00 to	45.00
Cantripped motor proons !!		

Boston

Brokers buying prices per gro	ss ton, or	cars:
No. 1 hvy. melting	\$50.50 to	\$51.50
No. 2 hvy. melting		
No. 1 bundles	44.00 to	45.00
No. 2 bundles	38.00 to	39.00
No. 1 busheling	44.00 to	45.00
Elec. furnace, 3 ft & under	53.00 to	54.00
Machine shop turn	26.00 to	27.00
Mixed bor. and short turn.	27.00 to	28.00
Shoveling turnings		30.00
Clean cast chem. borings	31.00 to	32.00
No. 1 machinery cast	45.00 to	46.00
Mixed cupola cast	41.00 to	42.00
Heavy breakable cast		43.00
Stove plate	38.00 to	39.00
Unstripped motor blocks	32.00 to	33.00

New York

Brokers buying prices per gro	ss ton, on cars:
No. 1 hvy, melting	\$50.00 to \$51.00
No. 2 hvy. melting	41.00 to 42.00
No. 2 bundles	37.00 to 38.00
Machine shop turn	
Mixed bor. and turn	30.00 to 31.00
Shoveling turnings	34.00 to 35.00
Clean cast chem. borings	29.00 to 30.00
No. 1 machinery cast	49.00 to 50.00
Mixed yard cast	45.00 to 46.00
Charging box cast	
Heavy breakable cast	
Unstripped motor blocks	34.00 to 35.00

Birmingham

No. 1 hvy. melting	42.00	to	\$43.00
No. 2 hvy. melting	40.00	to	41.00
No. 1 bundles	42.00	to	43.00
No. 2 bundles	34.00	to	35.00
No. 1 busheling	42.00	to	43.00
Machine shop turn	27.00	to	28.00
Shoveling turnings	29.00	to	30.00
Cast iron borings	24.00	to	25.00
Electric furnace bundles	51.00		52.00
Bar crops and plate	55.00	to	56.00
Structural and plate, 2 ft	54.00	to	55.00
No. 1 RR. hvy. melting	52.00	to	53.00
Scrap rails, random lgth	61.00	to	62.00
Rails, 18 in and under	63.00	to	64.00
Angles & splice bars	58.00	to	59.00
Rerolling rails	67.00	to	68.00
No. 1 cupola cast	51.00	to	52.00
Stove plate	49.00	to	50.00
Charging box cast	38.00	to	39.00
Cast iron car wheels	39.00	to	40.00
Unstripped motor blocks	41.00	to	42.00
Mashed tin cans	15.00	to	16.00

Cincinnati

Brokers buying prices per gross ton, on c	ars:
No. 1 hvy. melting \$54.50 to \$53	5.50
No. 2 hvy. melting 45.00 to 40	6.00
	5.50
No. 2 bundles 42.00 to 43	3.00
	3.50
	5.50
	6.50
	5.50
	0.00
Accessed, a construction of the control of the cont	6.00
	5.00
	7.00
Arty. Dictional County III.	7.00
Drop broken cast 55.00 to 5	6.00

San Francisco

No. 1 hvy. melting		\$46.00
No. 2 hvy. melting		43.00
No. 1 bundles		44.00
No. 2 bundles		35.00
No. 3 bundles		29.00
Machine shop turn		27.00
Cast iron borings		
No. 1 RR. hvy. melting		46.00
No. 1 cupola cast	0000	52.00

Los Angeles

Pos Wilderes	
No. 1 hvy. melting	\$46.00
No. 2 hvy. melting	44.00
No. 1 bundles	45.00
No. 2 bundles	35.00
No. 3 bundles	33.00
Machine shop turn	27.00
Shoveling turnings	25.00
Cast iron borings	24.00
Elec. furn. 1 ft and under	47.00
No. 1 RR. hvy. melting	46.00
No. 1 cupola cast	47.00
Seattle	

Seattle											
No. 1 hvy. melting	g	h								*	\$46.00
No. 2 hvy. melting	E		0							×	42.00
No. 2 bundles		8		,	,	*		,	, ,		31.00
No. 3 bundles										ie.	27.00
No. 1 cupola cast.										*	45.00
Mixed yard cast.	×		,	ė		8			,		45.00

Hamilton, Ont.

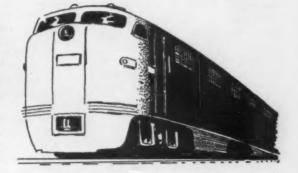
No. 1 hvy. melting		\$49.00
No. 2 hvy. melting		44.00
No. 1 bundles		49.00
No. 2 bundles		41.00
Mixed steel scrap		43.00
Bushelings		39.50
Bush., new fact., prep'd	****	47.00
Bush., new fact., unprep'd		43.00
Machine shop turn	****	25.00
Short steel turn		28.00
Mixed bor. and turn		26.00
Rails, rerolling	****	57.00
Cost soron		50.00



Centuries before the era of Diesel locomotives and steel streamliners, English coal mine carts ran on timbers.

In 1776, "improved" rails of cast iron were produced in Coalbrookdale, England, with an inside flange some 3 inches above the path of the wagon wheel. These rails, laid on cross sleepers or longitudinal sills, proved unsatisfactory, however, because dirt collected on the surface and caused hard traction.

Now, thousands of miles of steel rails crossing and criss-crossing the continent assure fast, smooth transportation. To maintain the vast facilities and equipment of the nation's railroads, and for thousands of other civilian and military requirements, an unfailing supply of steel is vital. And scrap is demanded in tens of thousands of carloads.



For the purchase or sale of iron or steel scrap . . . phone or write "Your Chicago Broker"



231 S. La Salle St., Chicago

Telephone ANdover 3-3900

Aluminum Pig Now 1c More

Big 3 primary aluminum producers boost pig price by 1¢ per lb . . . All products up accordingly . . . Average up about 4 pct . . . Report labor costs up 9 pct.

◆ ALL THREE of the major U. S. primary aluminum producers have raised their prices for basic aluminum pig by 1¢ per lb to 25¢ per lb.

Prices of other aluminum products were boosted proportionately. Aluminum Co. of America says the increase in price averages 4 pct, while increased labor costs growing out of labor contract settlements average 9 pct for the first year.

Alcoa initiated the expected move, effective Aug. 10, within 24 hours of signing with United Steel Workers on terms of a new three-year contract.

Kaiser moved up one day later. Kaiser's contract with the union doesn't expire until Aug. 31.

On Aug. 13 Reynolds made it unanimous. At that time the company hadn't come to terms with USW. It explained that the move was necessary because of increased labor costs resulting from the settlement with Aluminum Workers International.

The new company-union contracts will cost aluminum producers about 46¢ per hour over a three year period. Overall it is similar to the steel settlement with certain key differences due to fundamental operating dissimilarities.

According to Alcoa, total bene-

fits will cost 20ϕ per hour the first year, $11\frac{1}{2}\phi$ the second, and $14\frac{1}{2}\phi$ the third year. Wages will increase an average of $9\frac{1}{2}\phi$ per hour this year, 7ϕ per hour in 1957, and 8ϕ per hour in '58.

Wage rate structures, additional holiday pay, supplemental unemployment benefits, jury pay, increased insurance benefits, incentive adjustments, a modified union shop, increased pension minimums, additional vacation allowances, a cost of living and adjustment formula, and an additional paid holiday make up the difference between the wage increase and the total package.

Although most potlines that were shut down by the strike are expected to be back in production by end of the week, the industry will not be back to full production for at least another week.

Since production for the last full month, July, was at least close to the all-time high, and there was still no suggestion of the slightest oversupply, the effects of the shutdown are sure to be felt into the beginning of fourth quarter. Lost production, including time to get back into action, will be about 30,000 tons.

TIN . . . Market is quiet and just a little uneasy. No one seems to know exactly what the labor situation is in Malaya, world's largest producer. The Malayan Mining Employees Union has issued a strike call for Aug. 21. About 18,000 workers in 60 European owned mines are affected. The union officials are insisting that they will get 100 pct cooperation from their members.

The managers of the Europeanowned properties state that the strike will not be effective.

Other news from Malaya is generally favorable. The chairman of the Penang (largest smelter in Malaya) Port Commission has indicated his plans call for expenditure of 21 million Malayan dollars for improvements, including modernization of the dry dock, and construction of a new terminal.

At the annual meeting of the Malayan Chamber of Mines the chairman reported, "Unless a recession in industrial activity occurs, particularly as affecting the tinplate industry, the degree of curtailment in production of tin necessary to balance the supply and demand should therefore not be great."

MAGNESIUM... Industry will get as much information as is not classified about selection of magnesium as the metal for the skin of the outer space satellite, at the 12th annual convention of the Magnesium Assn. Executive Secretary Jerry Singleton reports that the meeting is scheduled for Oct. 4 and 5 in the Drake Hotel, Chicago, and that J. P. Walsh, deputy director of Project Vanguard, will deliver the address.

Dow Chemical Co. raised the price of its magnesium 1½¢ per lb, effective Aug. 13. Pig at Velasco, Tex., now costs 35¼¢, ingot 36¢ per lb. Mill products prices increased 3-5 pct depending on composition.

Dow has just signed new contracts with some 11 unions at its Freeport, Tex., plant after a four week strike. Details of the pact, beyond the fact that it will run for 3 years with across the board wage increases, are not yet available.

COPPER . . . Negotiations have begun between Kennecott Copper Corp. and United Steel Workers at the Garfield, Utah, refinery; and between the same union and American Smelting & Refining Co. at their Garfield smelter. Certain concessions granted in both steel and aluminum are not general practice in the copper industry and were not given to the vast majority of Kennecott workers represented by MMS&W.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Aug. 8	Aug. 9	Aug. 10	Aug. 11	Aug. 13	Aug. 14
Copper, electro, Conn.	40.00	40.00	40.00	40.00	40.00	40.00
Copper, Lake, delivered	40.00	40.00	40.00	40.00	40.00	40.00
Tin, Straits, New York	98.75	98.50	98.50		98.625	98.625*
Zinc, East St. Louis	13.50	13.50	13.50	13.50	13.50	13.50
Lead, St. Louis	15.80	15.80	15.80	15.80	15.80	15.80
Note: Quotations are going	prices.					*Tentative



CHASE' DRY-ROLLED BRASS & COPPER

What an amazing timesaver! Wonderfully smooth Chase Dry-Rolled strip forms as quickly and easily as ordinary quarter or half-hard strip. Yet, parts are so mirror-bright that regular buffing operations can be slashed—sometimes even eliminated!

Chase Dry-Rolled brass or copper strip is actually burnished at the mill, by super-smooth rolls. It's a special finishing process that can be applied to many of the Chase alloys you regularly use.

No extra charge for Chase Dry-Rolled strip! That's why it'll pay you to call in a Chase representative to talk over the use of this cost-cutting metal. Call today!



WATERBURY 20, CONNECTICUT SUBSIDIARY OF KENNECOTT COPPER CORPORATION

The Nation's Headquarters for Brass, Copper and Stainless Steel

Atlanta Baltimore Boston Charlotte Chicago Cincinnati Cleveland Dallas Denver Detroit Grand Rapids Houston Indianapolis Kansas City, Mo. Los Angeles

Milwaukee Minneapolis Newark New Orleans New York Philadelphia Pittsburgh Providence Rochester St. Louis San Francisco Seattle Waterbury

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate ("F" temper except 6061-0)

Alloy	.032	.081	.136-	3,
1800,1100, 3003 5052 6061-0	44.3 51.8 48.9	42.1 46.8 44.6	40.9 45.1 42.8	40.2 42.9 42.6

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6- 8.	45.5-47.3	61.3-65.1
12-14.	46.2-47.7	62.2-66.8
24-26.	49.4-49.5	73.1-77.8
36-38.	58.3-59.0	97.4-101.0

Screw Machine Stock-2011-T-3

Size"	34	36-36	3/4-1	134-132
Price	59.7	58.8	57.4	55.2

Roofing Sheet, Corrugated

(Per sl	neet, 1	6" wi	de base,	16,000	lb)
Length .	4	72	96	120	144

Length'→	72	96	120	144
.019 gage	\$1.352	\$1.803	\$2.254	\$2.704
.024 gage	1.686	2.252	2.815	3.378

MAGNESIUM

(f.o.b. shipping pt., carload frt. allowed) Sheet and Plate

Type→ Gage→	.250- 3.00	250-	.188	.081	.083
FS1 Stand, Grade		65.6	06.5	75	100
FS1 Spec.	*****	88.9	91.1	108.5	163.1
Tread Plate		57.8	68.9		
Teoling Plate	70.2				

Extruded Shapes

factor->	6-8	12-14	24-26	30-38
Comm. Grade	06.4-	67.5-	73.1-	84.9-
(FS)	60.0	69.6	72.7	85.8
Spec. Grade	81.4-	82.5-	87.1-	99.9-
(AZ31B)	84.0	84.6	87.7	100.8

Alloy Ingot

AZ91B (Die Castine	
	40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base	prices, f.o.	b. m(ll)	
	"A" Nickel	Monel	Inconel
Sheet, CR	102	83	99
Strip, CR	102	92	125
Rod. Bar. HR.	87	74	93
Angles, HR	87	74	93
Plate, HR	97	87	95
Seamless tube	122	110	168
Shot, blocks		71	

COPPER, BRASS, BRONZE

(Freight included on 500 lbs)

	Sheet	Wire	Rod	Tube
Copper	61.63			61.83
Brass, 70/30	52.10	52.64		55.01
Brass, Low	55.85	56.39	55.75	58.66
Beam, R L	57.19	57.73	57.13	60.00
Bram, Naval	55.72		50.08	58.88
Munts Metal	53.84	47.85	49.65	
Comm. Bs.	59.08	59.62	59.02	61.64
Mang. Bs.	59.46		53.56	
Phos. Bs. 8%	79.58		80.08	
		1		

TITANIUM

TITANIUM

(10,000 Ib base, f.o.b. mill)

Sheet and strip, commercially pure, \$12.10\$12.60; alloy, \$15.00-\$15.76; Plate, HR, commercially pure, \$10.00-\$10.80; alloy, \$11.60;
\$12.00. Wire, rolled and/or drawn, commercially pure, \$8.00-\$11.50; alloy, \$11.50; Bar, HR or forged, commercially pure, \$7.56-\$7.78.

PRIMARY METAL

(Cents per Ib, unless otherwise noted) Aluminum ingot, 98+%, 10,000 lb.
freight alloyed 27.10
Aluminum pig 25.00
Antimony, American, Laredo, Tex., 33.50
Beryllium copper, per lb conta'd Be. \$43.00
Beryllium aluminum 5% Be. Dollars
per lb contained Be\$74.75
Bismuth, ton lots\$ 2.25
Cadmium, del'd 1.70
Cobalt, 97-99% (per lb) \$2.60 to \$2.67
Copper, electro, Conn. Valley 40.00
Copper, Lake, delivered 40.00
Gold, U. S. Treas., per troy oz\$35.00
Indium, 99.9% dollars per troy os. \$ 2.25
Iridium, dollars per troy oz\$90 to \$100
Lead, St. Louis
Lead, New York
Magnesium, 99.8+%, f.o.b. Velasco,
Tex., 10,000 lb, pig 35.25
inget 10,000 10, pig
ingot
Magnesium, sticks, 100 to 500 ib 55.00
Mercury, dollars per 76-lb flask,
f.o.b. New York\$255 to \$257
Nickel electro 64.50
Nickel oxide sinter at Copper
Cliff, Ont., contained nickel 60.75
Palladium, dollars per troy oz \$23 to \$24
Platinum, dollars per troy oz. \$103 to \$105
Silver, New York, cents per troy oz. 90.75
Tin, New York
Titanium sponge, grade A-1, \$2.70 to \$3.00
Zinc, East St. Louis 13.50
Zinc, New York 14.00
Zirconium sponge\$10.00
*Tentative.

REMELTED METALS

(Cents per 85-5-5 ingot No. 115 No. 126 No. 128 80-10-10 ingot No. 805 No. 815 88-10-2 ingot No. 210 No. 215 No. 245 No. 245								* *			 		 			37.78 36.50
No. 115 No. 120 No. 123 80-10-10 ingot No. 805 No. 815 88-10-2 ingot No. 210 No. 215 No. 245											*			×		
No. 120 No. 123 80-10-10 ingot No. 805 No. 815 88-10-2 ingot No. 210 No. 215 No. 245											*			×		
No. 123 80-10-10 ingot No. 805 No. 815 88-10-2 ingot No. 210 No. 215 No. 245															*	36.50
80-10-10 ingot No. 805 No. 815 88-10-2 ingot No. 210 No. 215 No. 245																
No. 805 No. 815 88-10-2 ingot No. 210 No. 215 No. 245												×				35.00
No. 815 88-10-2 ingot No. 210 No. 215 No. 245																
88-10-2 ingot No. 210 No. 215 No. 245															×	41.00
No. 215 No. 245			*		*		*									39.2
No. 215 No. 245																
No. 245																52.7
	× 4			*	*										*	
											 					43.5
Yellow ingot																
No. 405																29.7
Manganese br	0	n	E	В												
No. 421													 			33.0
		101	-	i	-	87	n	1	h	ıe	ě					
(Cents nor 1																

(Cents per lb del'd 20,000 lb	and over)
95-5 aluminum-silicon alloys 0.30 copper max.	.28.25-29.06
0.60 copper max	.28.00-28.73
Piston alloys (No. 122 type). No. 12 alum. (No. 2 grade)	27.75-28.78
108 alloy	.27.00-28.00
195 alloy (0.60 copper max.)	
AXS-679	.27.00-28.0

Steel deoxidizing aluminum, notch bar

	granul	a۱	a	4	И	۲	8	Ш	0	т	
Grade	1-95-9714	%									.27.00-28.00
Grade	2-92-95%								×		.26.00-27.00
Grade	3-90-92%			0							.25.00-26.00
Grade	4-85-90%										24.00-25.00

SCRAP METALS

Brass Mill Scrap
(Cents per pound, add 1¢ per lb for

shipments of 20,000 lb and Heavy	over) Turnings
Copper 36	3514
Yellow brass 37%	25%
Red brass 31%	81 1/6
Comm. bronze 33%	32%
Mang. bronse 25 %	34 1/2
Yellow brass rod ends 27	
Custom Smelters Scrat	

(Cents per pound carload lots, delivered

No. 1 copper	wire								34%
No. 2 copper	wire	*	*						331/4
Light copper			0			*		* :	30%
*Refinery bra	LSS						*		 31
· Dry copp	er cor	114	1	nt					
					_		-		

Ingot Makers Scrap (Cents per pound carload lots, delivered

to rega	tery)	
No. 1 copper wire		34%
No. 2 copper wire		331/4
Light copper		30%
No. 1 composition	*******	301/4
No. 1 comp. turnings		29 %
Hvy. yellow brass so		
Brass pipe		211/2
Radiators		231/
Alum	insem	
Mixed old cast		19 20

Mixed old cast. 19 —20 Mixed new clips 19½—20½ Mixed turnings, dry 19½—20½ Declers' Scrap (Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 copper wire	32 1/4 33
No. 2 copper wire	30 -30 1/4
Light copper	271/2-28
Auto radiators (unsweated)	19 -19 1/4
No. 1 composition	251/2-26
No. 1 composition turnings	241/2-25
Unlined red car boxes	20 -21 1/4
Cocks and faucets	19 1/2 20
Clean heavy yellow brass	17 -17%
Brass pipe	211/2-22
New soft brass clippings	23 -23 4
No. 1 brass rod turnings	201/4-21

Aluminum

- 81/2
-131/2
-16%
-13 1/2
- 91/2
-131/2
-16 1/2
_

Zinc

Old die cast scrap	2 75 mm 275
Nickel and Monel	
Pure nickel clippings	\$1.65-\$1.90
Clean nickel turnings	\$1.50
Nickel anodes	\$1.65-\$1.90
Nickel rod ends	\$1.65-\$1.90
New Monel clippings	75-86
Clean Monel turnings	60-70
Old sheet Monel	65-75
Nickel silver clippings, mixed	21
Nickel silver turnings, mixed	18

Mickel silver turnings, mixed	10
Lead	
Soft scrap lead	1214-13
Battery plates (dry)	7 - 7%
Batteries, acid free	4 1/4
Miscellaneous	
Block tin	
No. 1 pewter	621/4-68
Auto babbitt	42 -4234
Mixed common babbitt	13 -134

	ON AGE		reanco iden	tary produce	rs listed in	sey at end or t	anie, Dase	proces, 1.0.D.	mill, in cents po	er ID., Unicon	OCHER WING IN	nou, ransas	abbox.	
	RICES		rs, bloc slabs	OMS,	PIL- ING		HAPES JCTUR	ALS			STR	IP		
At	(Effective ug. 14, 1956)	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Shoet Steel	Carbon	Hi Str. Law Alloy	Carbon Wide- Flange	Hot- rolled	Cold- rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot- rolled	Alloy Cold- rolled
	Bethlehem, Pa.			\$107.00 B3		5.05 B3	7.40 B3	5.65 B3						
-	Buffalo, N. Y.	\$74.00 B3		\$107.00 B3, R3	5.90 B3		7.40 B3	5.05 B3	4.675 B3, R3		6.95 B3			
	Claymont, Del.													
	Harrison, N. J.													
	Conshehocken, Pa.		\$96.50 A2	\$114.00 .42					4.725 A2	6.90 A2	6.95 A2			
	New Bedford, Mass.													
비 -	Johnstown, Pa.	\$74.00 B3	\$91.50 B3	\$107.00 B3		5.05 B3	7.40 B3							
-	Boston, Mass. New Haven, Conn.									7.30 A5				
-	Pheenixville, Pa.					5.85 P2		5.85 P2						
-	Sparrows Pt., Md.								4.675 B3		6.95 B3			
	Bridgeport, Wallingford, Conn.	\$79.88 N8	\$96.50 N8											
	Pawtucket, R. I. Worcester, Mass.									7.40 /15				
	Alten, III.								4.875 <i>L1</i>					
	Ashland, Ky.													
	Canton-Massillon, Dever, Obio		\$91.50 R3	\$107.00 R3										
	Chicago, III.	\$74.00 UI	\$91.50 UI, R3,W8	\$107.00 UI, R3,W8	5.90 UI	5.00 UI,	7.35 UI, YI 6.80 W8	5.00 UI	5.525 N4 4.65 A1	6.95 Al			7.75 W8	
	Cleveland, Ohio									6.85 A5,J3			7.75 J3	
	Detroit, Mich.								4.775 G3, M2	6.95 M2 6.95 G3	7.85 G3	10.20 G3	7.05 G3	
	Duluth, Minn.													
MIDDLE WEST	Gary, Ind. Harbor, Indiana	\$74.00 UI	\$91.50 UI	\$107.00 UI, YI	5.90 /3	5.00 UI	7.3\$ U1,13	5.00 /3	4.675 UI, 13, YI		6.95 UI. 13, YI	10.20 Y/	7.75 UI, YI	
DIE	Sterling, III.	-							4.775 N4					
MID	Indianapolis, Ind.													
	Newport, Ky.													
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		\$91.50 SI, CIO	\$107.00 SI CIO					4.675 SI, R3	6.85 T4	6.95 SI,	10.00 SI	7.75 SI	14.55 S
	Pittaburgh, Pa. Midland, Pa. Butler, Pa.	\$74.00 UI, J3	\$91.50 UI, J3	\$107.00 UI	5.90 UI	5.00 UI. J3	7.35 UI, J3	S.00 U/	4.675 P6	5.750 P6 6.85 J3				
	Pertsmouth, Ohio													
	Weirton, Wheeling, Fellanshee, W. Va.					5.00 W3			4.675 W3	6.85 W3 6.25 F3	6.95 W3	9.65 W3		
	Youngstown, Ohio		\$91.50 Y/	\$107.00 Y	7	5.00 Y/	7.35 YI		4.675 UI, YI	6.85 Y1	6.95 UI, YI	10.20 Y/	7.75 UI. YI	
	Fontana, Cal.	\$83.50 K1	\$101.00 K1	\$129.00		5.70 K1	8.05 K1	5.85 K1	5.475 K1	8.68 K1	9.725 KI			
	Geneva, Utah	\$91.50 C7				5.00 C7	7.35 C7							-
	Kansas City, Mo.					5.10 S2	7.45 S2		4.925 52		7.20 S2		6.375 S2	
-	Les Angeles, Terrance, Cal.		\$101.00 B			5.70 C7, B2	8.05 B2		5.425 <i>B2</i> , <i>C7</i>					
WEST	Minnequa, Cols.					5.30 Ci	-		5.775 C6					
-	Portland, Ore.													
	San Francisco, Niles Pittsburg, Cal.		\$101.00 B	?		5.65 B2	8.00 B2		5.425 C7,B2					
	Seattle, Wash.		\$105.00 B.	2		5.75 B2	8.10 B2		5.675 B2					
-	Atlanta, Ga.								4.875 A8					
SOUTH		\$74.00 TZ	\$91.50 T2			5.00 T2,R 5.30 C/6	7.35 72		4.675 T2,R 4.975 C16	3	6.95 T2			
1 50	Houston, Lone Star,		\$96,50 S2	\$112.00 S	9		7.45 S2		1		7.20 S2			

	STEEL				0						WIRE	TINPI	ATE	BLACK
P	RICES				5	HEETS					ROD	HINFI	AIL	FLATE
A	(Effective ug. 14, 1956)	Hot-rolled 18 ga. & hvyr.	Cold- rolled	Galvanized 10 ga.	Enamel- ing 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Allov Galv.	Hot- rolled 19 ga.		Cokes* 1,25-lb, base box	Electro* 0.25-lb. base box	Holloware Enameling 29 ga.
1	Behtlehem, Pa.													
	Buffalo, N. T.	4.675 B3	5.75 B3				6.90 B3	8.525 B3				† Special ce	ated mfg.	
-	Claymont, Del.											terne deduct 1.25-lb. coke	Dase box	
-	Coatesville, Pa.											blackplate 55	to 128 lb. from 1.25 lb.	-
1-	Conshohocken, Pa.	4.725 A2	5.80 A2				6.95 A2	-				* COKES	x.	-
-	Harrisburg, Pa.		2000 710	-			200710	-	-			add 25c. ELECTRO:	0.50-lb. add	
-	Hartford, Conn.						-					25¢; 0.75-lb.	add 65¢; \$1.00. Differ-	-
EASI	Johnstown, Pa.										5.80 B3	ential 1.00 li add 65¢.	./0.25 lb.	
1	Fairless, Pa.	4.725 U1	S.80 U/				6.95 UI	8.575 UI				\$9.70 UI	\$8.40 UI	
	New Haven, Conn.													
	Phoenisville, Pa.	-						-	-					-
	Sparrows Pt., Md.	4.675 B3	5.75 B3	6.30 B3	-		6.90 B3	8.575 B3	9.275 B3		5.90 B3		-	-
	Wercester, Mass.										6.10 UI			
	*					_								-
_	Trenton, N. J.													
	Alten, III. Ashland, Ky.	-			-		-	-	-		6.00 L1		-	-
	Canton-Massillen,	-	-	4 20 P?	6.325 R3	-	-	-	-	-		-		-
	Dover, Ohio			6.30 R3	6.323 K)									
	Chicago, Joliet, Ill.	4.675 W8,					6.90 UI			5.80 K2	\$.80.45, R3, N4, W8			
	Sterling, III.				-		-				5.90 N4			-
	Cleveland, Ohio	4.675 J3,	5.75 J3,				6.90 R3	8.525 R3,			5.80 .45			
	Detroit, Mich.	4.775 G3,	83 5.85 G3 5.75 M2				7.00 G2	8.625 G3	-					
		-					-				-	-		
ST	Newport, Ky.									-			********	
MIDDLE WEST	Gary, Ind. Harber, Indiana	4.675 U1, 13, Y1	5.75 UI, 13, YI	6.30 U1,	6.325 U1, 13, Y1	6.70 UI	6.90 U1, Y1,13	8.525 U1, Y1			5.80 Y/	\$9.60 UI, 13, YI	\$8.30 I3, U1, Y1	7.15 UI, YI
001	Granite City, III.	4.875 G2	5.95 G2	6.50 G2	6.525 G2								8.40 G2	7.25
2	Kokomo, Ind.			6.40 C9							5.90 C9			
	Mansfield, Ohio													
	Middletown, Ohio													-
	Niles, Warren, Obio Sharon, Pa.	4.675 S1, R3	5.75 R3	6.30 R3			6.90 SI, R3	8.525 SI, R3						
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.675 UI, J3	5.75 UI. J3	6.30 U1, A7,J3	6.325 UI, A7		6.90 U1, J3,R3	8.525 UI, J3	9.275 UI		\$.80 A5, P6,J3	\$9.60 J3, UI	\$8.30 UI	7.15 UI
	Portsmouth, Ohio													
	Weirton, Wheeling, Fellansbee, W. Va.	4.675 W3, W5	5.75 W3,W 5.32 F3	5 6.30 W3, W5		6.79 W3, W5	6.90 W3	8.525 W3				9.60 W5	8.30 W5	7.15 W: 7.40 W:
	Youngstown, Ohio	4.675 UI, YI	5.75 Y/		6.325 Y/		6.90 Y/	8.525 YI			5.80 Y/			7.15 Y/
	Fentana, Cal.	5.475 K1	6.95 <i>K</i> /				7.70 KI	9.725 K1				\$10.35 K/	\$9.05 K1	\$7.75 K
	Geneva, Utah	4.775 C7						-						-
	Kansas City, Mo.										6.05 S2			
ST	Los Angeles, Torrance, Cal.													
WEST	Minnequa, Colo.				-	-		-	-	-	6.05 C6	-	-	
	San Francisco, Niles	5.375 C7	6.70 C7	7.05 C7		-		-	-	-	6.45 C7	-	-	-
	Pittsburg, Cal. Seattle, Wash.							-	-	-		-	-	-
-	Atlanta, Ga.							-						-
SOUTH	Fairfield, Ala.	4.675 T2.	5.75 T2	6.30 72,			-			5.80 R3	5.80 T2		-	-
9	Alabama Ci.y, Ala.	R3	1	R3								1		

	ION AGE		reacts identity p	roducers lister	in key at end o	table. Dase p	rices, r.o.b. mil	i, in cents per it	o., uniess oth	erwise noted. I	Acras approy.	
	RICES			BA	RS				PLA	TES		WIRE
A	(Effective ug. 14, 1956)	Carbon Steel	Reinforc-	Cold Finished	Alloy Hot- tolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor	Alloy	Hi Str. Low Alloy	Mfr's. Bright
	Bethlehem				6.125 B3	8.325 B3	7.40 B3					
	Buffalo, N. Y.	5.075 B3, R3	5.075 B3, R3	6.90 B5	6.125 B3,R3	8.325 B5	7.40 B3	4.85 B3				
	Claymont, Del.											
	Coatesville, Pa.							5.25 L4		6.85 L4	7.55 L4	
	Conshohocken, Pa.							4.90 A2	5.925 A2	6.25 A2	7.25 A2	
	Harrisburg, Pa.								6.275 C3			
1	Hartford, Conn.			7.35 R3		8.625 R3	7.40 B3					
_	Jehnstewn, Pa.	5.075 B3	5.075 B3		6.125 B3			4.85 B3		6.85 B3	7.25 B3	7.20 B3
EAST	Fairless, Pa.	5.225 UI	5.225 UI		6.725 UI							
	Newark, N. J.											
Ī	Camden, N. J.			7.30 P10								
	Bridgeport, Putnam, Cenn.	5.30 N8	5.30 N8		6.20 N8							
	Sparrows Pt., Md.		5.075 B3					4.85 B3		6.85 B3	6.85 B3	7.30 B3
	Palmer, Worcester, Readville, Mass.			7.40 B5		8.325 A.5						7.50 A5
	Milton, Pa.			7.40 B5		8.625 B5						
	Spring City, Pa.			7.30 K2		8.50 K2						
	Alten, III.	5.275 L1										7.40 L1
	Ashland, Newport, Ky.											
	Canton-Massillon, Mansfield, Ohio			6.85 R3	6.125 R3	8.325 R3						
	Chicago, Jolist, III.	5.075 U1, R3, W8 5.425 N4	5.075 U1,R3, N4	6.85 A5,B5, W10, L2, R3, W8,L2	6.125 UI, R3, W8	8.325 A5,B5, R3,W8,L2	5.875 W8	4.8\$ U1,13, R3,W8,A1	5.925 UI	6.85 U1,W8	7.25 UI	7.20 A5, R3,N4,H
	Cleveland, Ohio	5.075 R3	5.075 R3	6.85 A5	6.12	8.325 A5	7.425 R3	4.95 J3,R3	5.925 J3		7.25 J3,R3	7.20 A5
	Detroit, Mich.	5.175 G3	5.425 G3	7.05 <i>B5</i> 7.10 <i>P3</i>	6.225 G3	8.525 B5,P3	7.525 G3	4.95 G3		6.90 G3		
WEST	Duluth, Minn.											
	Gary, Ind. Harbor, Crawfordsvillo	5.075 U1,13, Y1	5.075 U1,13, Y1		6.125 U1,13, Y1		7.425 U1,13, Y1	4.85 U1,13, Y1	5.925 13	6.85 UI, YI	7.25 U1, Y1	7.30 M4
MIDDLE	Granite City, III.							5.05 G2				
Σ	Kokomo, Ind.											
	Sterling, III.	5.525 N4	5.175 N4									7.30 C9
	Niles, Warren, Ohio Sharen, Pa.	5.075 R3		6.85 C10	6.125 C10,S1	8.325 C10	7.425 SI	4.85 S1,R3		6.85 <i>S1</i>	7.25 S1,R3	
	Pittaburgh, Pa. Midland, Pa.	5.075 UI. CII.J3	5.075 U1,J3	6.85 A5,C8, C11,J3,R3, S9	6.125 <i>UI</i>	8,325 A5,R3, S9	7.425 U1, 3	4.85 U1,J3	5.925 U1	6.85 U1, J3	7.25 U1, J3	7.20 A5.J P6
	Portsmouth, Ohio											
	Weirton, Wheeling, Follansbee, W. Va.							4.85 W5				
	Youngstown, Ohio	5.075 UI. YI,R3	5.075 UI, YI,R3	6.85 U1, Y1	6.125 UI, YI	8.325 Y/	7.425 UI, YI	4.85 UI, YI, R3		6.85 YI	7.25 YI	7.20 YI
_	Emeryville, Cal.											
	Fontana, Cal.	5.775 K/	5.575 <i>K1</i>		7.175 K/		8.125 K1	6.00 KI		8.00 K1	8.40 K/	
	Geneva, Utah	5.175 C7						4.85 C7			7.25 C7	
	Kansas City, Mo.	5.325 S2	5.325 S2		5.325 S2		7.675 S2					7.45 S2
EST	Les Angeles, Terrance, Cal.	5.775 C7,B2	5.775 C7,B2	8.30 R3								
WE	Minnequa, Cole.	5.525 C6	5.525 C6					5.70 C6				7.45 C6
	Portland, Ore.											
	San Francisco, Niles Pittsburg, Cal.	5.775 C7 5.825 B2	5.775 C7									8.15 C7,0
	Seattle, Wash.							5.75 B2			8.15 B2	
-	Atlanta, Ga.	5.575 A8										7.40 48
SOUTH	Fairfield, Ala. City, Birmingham, Ala.	5.075 T2, R 5.375 C16	5.075 T2, R3 5.375 C/6				7.425 T2	4.85 T2, R3			7.25 T2	7.20 T2,
80	Houston, Ft. Worth, Lone Star, Tex.		5.325 52		6.375 S2		7.675 S2	4.95 S2		6.95 S2		7.45 S2

Steel Prices (Effective Aug. 15, 1956)

Key to Steel Producers

With Principal Offices

Al Acme Steel Co., Chicago

42 Alan Wood Steel Co., Conshohocken, Pa.

A2 Alan Wood Steel Co., Connhohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittaburgh 44 American Cladmetals Co., Carnegie, Pa.

A5 American Steel & Wire Div., Cleveland

A6 Angell Nail & Chaplet Co., Cleveland

A7 Armco Steel Corp., Middletown, Ohio

48 Atlantic Strel Co., Atlanta, Ga.

BI Babco:k & Wilcox Tube Div., Beaver Falls, Pa. Babco:k & Wilcox Tube Div., Beaver Falls, Pa.
Bethlehem Pacific Coast Steel Corp., San Francisco

K1 Kaiser Steel Corp., Fontana, Cal.

K2 Keystone Steel & Wire Co., Peoria

B3 Bethlehem Steel Co., Bethlehem, Pa. Be Blair Strip Steel Co., New Castle, Pa.

R5 Blise & Laughlin, Inc., Harvey, Ill.

Book Plant, Wickwire Spencer Steel Div., Birdeboro, Pa.

C1 Calstrip Steel Corp., Los Angeles C2 Carpenter Steel Co., Reading, Pa.

Central Iron & Steel Co., Harrisburg, Pa.

Central Iron & Steel Co., Harrisburg, Pa. Claymont Products Dept., Claymont, Del. Cold Metals Products Co., Youngstown, O. CS

C Colorado Fuel & Iron Corp., Denver C7

Columbia Geneva Steel Div., San Francisco Columbia Steel & Shafting Co., Pittsburgh

Continental Steel Corp., Kokomo, Ind.

CIO Copperweld Steel Co., Pittsburgh, Pa.

C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wins Co. Cu

C14 Compressed Steel Shafting Co., Readville, Mass.

C15 G. O. Carlson, Inc., Thorndale, Pa.

N4 Northwestern Steel & Wire Co., Sterling, Ill.

N5 Newport Steel Corp., Newport, Ky.

C16 Connors Steel Div., Birmingham

C17 Chester Blast Furnace, Inc., Chester, Pa.

DI Detroit Steel Corp., Detroit

D2 Detroit Tube & Steel Div., Detroit

D3 Driver Harris Co., Harrison, N. J. D4 Dickson Weatherproof Nail Co., Evanston, Ill.

D5 Henry Disston Div., Philadelphia

El Eastern Stainless Steel Corp., Baltimore

E? Empire Steel Co., Mansfield, O.

Firth Sterling, Inc., McKeesport, Pa. F1

F2 Fitzsimons Steel Corp., Youngstown

F3 Follansbes Steel Corp., Follansbee, W. Va.

G? Granite City Steel Co., Granite City, Ill. G3 Great Lakes Steel Corp., Detroit

G4 Greer Steel Co., Dover, O.

HI Hanna Furnace Corp., Detroit

12 Ingersoll Steel Div., Chicago

13 Inland Steel Co., Chicago 14 Interlake Iron Corp., Cleveland

Jackson Iron & Steel Co., Jackson, O.
 Jessop Steel Corp., Washington, Pa.
 Jones & Laughlin Steel Corp., Pittsburgh

J4 Juslyn Mig. & Supply Co., Chicago J5 Judson Steel Corp., Emeryville, Calif.

K3 Koppera Co., Granite City, III.

K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Strei Co., St. Louis L2 La Salle Steel Co., Chicago

L3 Lone Star Steel Co., Dallas

L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel &c., Niles, O.
M2 McLouth Steel Corp., Detroit

M3 Mercer Tube & Mfg. Co., Sharon, Pa.

M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.

M5 Monarch Steel Div., Hammond, Ind.

M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.

NI National Supply Co., Pittsburgh

N2 National Tube Div., Pittaburuh

N3 Niles Rolling Mill Div., Niles, O.

No Northwest Steel Rolling Mills. Seattle

No Northwest Steel Couling Using, Seasons
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

01 Oliver Iron & Steel Co., Pittaburgh

02 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pligrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit

Pl Pacific States Steel Co., Niles, Cal.

P10 Precision Drawn Steel Co., Camden, N. I

P11 Production Steel Strip Corp., Detroit

P12 Pacific Steel Rolling Mills, Seattle

P13 Phoenix Mfg. Co., Joliet, Ill.

RI Reeves Steel & Mig. Co., Dover, O.

R2 Reliance Div., Eaton Mfg. Co., Massillon, O.

R3 Republic Steel Corp., Cleveland

R# Roebling Sons Co., John A., Trenton, N. J.

R5 Rotary Electric Steel Co., Detroit

R6 Rodney Metals, Inc., New Bedford, Mass.

R7 Rome Strip Steel Co., Rome, N. Y.

SI Sharon Steel Corp., Sharon, Pa.

S2 Sheffield Steel Div., Kansas City S3 Shenango Furnace Co., Pittsburgh

S7 Stanley Works, New Britain, Conn.

S8 Superior Drawn Steel Co., Monaca, Pa S9 Superior Steel Corp., Carnegie, Pa.

S10 Seneca Steel Service, Buffalo

77 Tonawanda Iron Div., N. Tonawanda, N. Y.

72 Tennessee Coal & Iron Div., Fairfield
73 Tennessee Products & Chem. Corp., Nashvills

74 Thomas Strip Div., Warren, O.

75 Timken Steel & Tube Div., Canton, O.

76 Tremont Nail Co., Wareham, Mass.

77 Texas Steel Co., Fort Worth

78 Thompson Wire Co., Boston

UI United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.

U3 Ulbrich Stainless Steels, Wallingford, Conn.

U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn. W2 Washington Steel Corp., Washington, Pa. W3 Weirton Steel Co., Weirton, W. Va.

W# Wheatland Tube Co., Wheatland, Pa.

Wish wheating tube Co., wheating, W. A.

Wish Wheeling Steel Corp., Wheeling, W. Va.

Wish Wickwire Spencer Steel Div., Buffalo

W7 Wilson Steel & Wire Co., Chicago

W8 Wiscomsin Steel Div., S. Chicago, Ill.

W9 Woodward Iron Co., Woodward, Ala. W10 Wyckoff Steel Co., Pittsburgh

W11 Worcester Pressed Steel Co., Worcester, Mass.

W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about \$200 per not ton.

							BUTTY	VELD										SEAM	LESS			
	1/2	In.	34.1	la.	1.16	n.	13/4	in.	11/2	ln.	2 1	e.	21/2-3	In.	2	in.	21/2	In.	3 1	п.	31/2-4	f In.
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Bik.	Gal.	Bik.	Gal.	Bik.	Gal.	Blk.	Gal.	Blk.	Gal.
parrows Pt. B3 oungstown R3	10.50 12.50	+4.75 +2.75		+0.75 1.25	16.00 18.00	2.75 4.75		3.50 5.50	19.00 21.00	4.50 6.50		5.00 7.00	21.00 23.00	4.75 6.75								
littsburgh J3	12.58 10.50 12.50	+4.75		1.25 +0.75 1.25	18.00 16.00 18.00	4.75 2.75 4.75		5.50 3.50 5.50		6.50 4.50 6.50	21.50 19.50 21.50	7.00 5.00 7.00		6.75 4.75 6.75					7.00			
airless N2 Pittsburgh N1. Wheeling W5	10.50 12.50 12.50	+4.75 +2.75	13.50 15.50 15.50		16.00 18.00 18.00	2.75 4.75 4.75	18.50 20.50	3.50 5.50 5.50	19.00	4.50 6.50 6.50	19.50 21.50	5.00 7.00 7.00	21.00 23.00	4.75	+2.00	+17	4,50	+12.25	7.00	+9.75	8.50	
Vheatland W4	12.50 12.50 11.50	+2.75	15.50 15.50	1.25	18.00	4.75 4.75 3.75	20.50	5.50 5.50 4.50	21.00	6.50 6.50 5.50	21.50	7.00	23.00 23.00	6.75	+2.00	+17	4.56	+12.25	7.00	+9.75	8.50	+8.2
erain N2		+2.75				4.75		\$.50		6.50					+2.0	+17		+12.21	7.00	+9.75	8.50	+8.2
PLAIN ENDS parrows Pt. B3	15.00			5.25		8.75		7.56		8.56			23.00	7.7								
airless N2	15.00														5							
ittsburgh J3	17.00	1.25	19.00	5.25	21.00	8.75	21.56	7.50	22.00			9.00	23.00	7.7	5	0 +14.5			9.5			
haren M3 ittsburgh N1 Vheeling W5		0 3.25	21.0	7.25	23.00	10.75	23.50	9.7	24.00	10.5	24.5	11.0	25.00	8.7	5 +0.5	0 +14.5	6 7.0	0 + 8.7	9.5	+6.2	5 14.50	0 +1.
Vheatland W4 oungstown Y1 ndiana Harber Y1	17.0 17.0	0 3.2	21.0	0 7.25	23.00		23.5	9.7	5 24.00	10.5	0 24.5	0 11.0		8.7	S +0.	0 +14.5	0 7.6	+8.7	5 9.5	0 +6.2	5 14.5	0 +1
Lorain N2	17.0								5 24.0		0 24.5	0 11.0				10 +14.5		+8.7			5 14.5	

Threads only, buttweld and seamless 2½ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount. Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1½, 1½ and 2-in., 1½ pt., 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3° inpe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ por lb.

TOOL STEEL

F.o.b	. mill					
W	Cr	V	Mo	Co	per lb	SAE
18	4	1	-	-	\$1.68	T-1
18	4	1	-	5	2.385	T-4
18	4	2	-	-	1.845	T-2
1.5	4	1.5	8	*****	1.04	M-1
6	4	3	6	-	1.43	M-3
6	4	2	5	direction.	1.185	M-2
High	-carb	on chi	romiu	m	.83 D	-3. D-5
Oil	harder	ned m	angai	nese	.45	0-2
Spec	ial ca	rbon .			.41	W-1
Extr	a car	bon			.345	W-1
Regu	ilar c	arbon			.29	W-1
W	areho	use pr	rices	on ar	d east o	f Mis-
eissi;	ppi a	re 4¢	per	lb hi	gher. W	est of
Miss	issipp	i, 6¢ 1	nigher			

CLAD STEEL Base prices, cents per lb f.a.b.

		Piate	(A3, J2	(, L4)	Sheet (12)
	Cladding	10 pct	15 pet	20 pct	20 pct
	304	34.60	38.00	41.50	
2	316	39.70	43.20	46.65	*********
B 73	321	36.35	39.80	43.50	
Stainless Type	347	39.50	43.95	48.45	
S	405	29.20	33.15	37.05	
	410, 430	28.70	32.65	36.55	

CR Strip (S9) Copper, 10 pct, 2 sides, 42.15; 1 side, 33.40.

ELECTRICAL SHEETS

22-Gage	Hot-Rolled		educed Cut Length)
F.o.b. Mill Cents Per Lb	(Cut Lengths)*	Semi- Processed	Fully Processed
Field	9.00	9.20	
Armature	10.35	10.35	10.85
Elect	11.00	11.025	11.525
Meter	12.05	12.075	12.575
Dynama	13.05	13.05	13.55
Trans. 72		14.05	14.55
Trans. 65	14.60	Grain (Driented
Trans. 58	15.10	Trans. 88.	18.50
Trans. 52	16.15	Trans. 73.	19.00

Producing points: Beech Bottom (W5); Brackenridge (A5); Granite City (G2); Indiana Harbor (I5); Mansfield (E2); Newport, K_2 , (N5); Niles, O. (N3); Vandergrift (U1); Warren, O. (R3); Zaneaville (A7).

LAKE SUPERIOR ORES

\$1.50% Fe natural content, delivered lower Lake ports. Prices for 1956 season Freight changes for seller's account.

											GG TO
Openhearth											
Old range,	bessem	er			۰		۰				11.3
Old range,	nonbes	861	00	le	r				۰		11.1
Mesabi, bes											11.0
Mesabi, non	bessen	er									10.8
High phosp											10.8

WARE-										Metre	politan P	rice, dell	lars per 1	00 lb.
HOUSE	S		Sheeta		Str	rip	Plates	Shapes	Ba	ITS		Allay	Bars	
Cale	Gay Delivery : Charge	Her-Ralled	Cald-Rolled	Galvanised (38 gage)	Hat-Raffed	Cald-Ralled		Standard	Het-Rolled	Celd- Finished	Het-Relled 4615 As Relled	Hat-Railed 4140 Annealed	Celd-Drawn 4615 As relied	Cald-Drawn 4140 Annealed
Baltimere	\$.10	7.31	8.32	8.37	7.65		7.63	7.93	7.61	8.62	14.38	13.44-	16.36	16.29
Birmingham.	15	6.80-	8.50-	8.85	7.71-		7.95-	7.93-	7.77-	9.35-		13.96		16.49
		7.68	8.88		7.78		8.01	8.05	9.91	10.04				
Besten	10	8.22-	9.17-	10.42-		11.10	8.51-	8.37-	8.37-	9.96-	14.65-	14.10-	17.61	17.31
Buffalo	15	8.72 7.96	9.57	10.92	8,81		9.01	8.87	8.81	8.85	14.81	14.26	18,40	18, 10
Dunaio	10	1.50	3.00	10.01	0.10		0.40	0. 99	0.13	0.00	13.00	14.45	10.40	10.10
Chicago	15	7.70-	8.64-	9.75	7.78-	9.55	8.01-	8.05-	7.92	8.35	14.35	13.80	17.15	16.85
		7.78	8.88		7.86		8.10	8.08		8.40				
Cincinnati	15	7.99	8.63	9.75	8.10		8.39	8.55	8.16	8.30	14.60	14.05	17.40	17.10
Cleveland	15	7.28-	8.39-	9.10-	7.46-		7.77-	7.91-	7.48-	8.15-	13.41-	13.36-	16.26-	16.41-
-		7.78	8.64	9.60	7.96		8.27	8.41	7.98	8.65	14.41	13.86	17.20	16.91
Denver		8.60	10.76	11.22	8.90		8.60	8.75	8.90	9.82				17.97
Detroit	,15	7.97	8.83	10.03	8.14		8.38	8.55	8.20	8,69	14.59	14.04	17.39	17.09
Henston		7.85	8.75	10.49	8.15		8.00	8.20	8.25	10.10-	14.35	15.90	17.15	17.05
Kansas City	20	8,45	9.31	10.42	8.53		8.77	8.75	9.12	9.32	15.02	14.47	17.82	17.52
Les Angeles	10	8.25	10.10	11.10	8,60		8.85	8.49	8.25	11.00		14.50		18.10
Memphia	15	8.10	8.96		8.18		8,42	8.40	9.05	9.65				
Milwaukee.	.15	7.37-	8,48-	9.34-	7.45		7.69-	7.75-	7.51-	8.09-	14.54	13, 39-	17.24	16.44-
		7.87	8.73	9.84	7.95		8.19	8.25	8.01	8.59		13,89	*****	16.94
New Orlean	ıs15	7.20	8.35		7.45	*****	7.40	7.70	7.50	9.55				
New York.	10	8.38	9.23	10.23	8.88		8.81	8.71	8.76	10.37	14.72	14.17	17.52	17.22
Nerfelk	20	7.25			7.65		7.45	7.95	7.65	9.50				
Philadelphia	. 10	7.44	8.54	9.51-	8.09-		7.82	7.85-	8.33	8,62-	14.50	13.45-	17.30	16.50
· manerymi	10	7.94	9.04		8.59		8.32	8.35	0.33	9.12	14.30	13.95	11.30	17.00
Pittsburgh.	15	7.78-		10.05	7.96	9.85*	8.18	8.08-	7.92	8.65	14.35	13.80	17.15	16.85
		7.83	9.03	10.00	8.03		8.16	8.20	7 05					
Pertland	*******	7.80	10.15	10.65	8.00	7.95	7.75	7.85-	7.95	12.20		15.00		17.50
Salt Lake C	lity 20	8.60	10.60		9.35			9.28	9.15					
San Francis	ico10	8.30	9.75	10.75	8.45		8,40	8.35	8.25	11.55		14.50		18.10
Seattle	00	8.75	10.50	10.90	8.90		8.50	8.50	8,60	12.25		14.75		17.80
St. Louis.	15	7.92		10.04	8.00		8.24					14.09	17.44	
		8.07			8.15		8.39		8.21	8.94	14.64		12.00	17.14
St. Paul	25	8.48	3.18	10.45	8.56		. 8.80	8.78	7.74	9.35	15.05	14.50	17.85	17.5

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanised sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanised sheets for quantity.

Exceptions. (1) 1500 to 9999 lb. (2) 1000 lb or over. (3) 2.25 delivery. (4) 1000 to 1999 lb, 3.25 delivery.

*Plus analysis charge.

*Plus analysis charge.

*Plus analysis charge.

MERCHANT WIRE PRODUCTS

	Standard & Coated Nail	Weven Wire Fence 9-151/2 ga.	"I" Fence Posts	Single Loop Bale Ties	Galv. Barbod and Twisted Barbless Wire	Merch. Wire Ann'ld	Merch. Wire Galv.
F.o.b. Mill	Col	Cel	Cal	Cal	Cel	¢/lb.	é/lh.
Alabama City R3 Aliquippa, Pa. J3 Atlanta A8 Bartenville K2*	167 150 169	184 167		195 177 197	184 180	8.10 8.10 8.20	8.56 8.65 8.80
Buffalo W6 Chicago, Ill. N4** Cleveland A6 Cleveland A5		186				8.10 8.10 8.10	8.70
Crawfordsville M4°. Denora, Pa. A5. Duluth A5. Fairfield, Ala. T2.	167	181		195	187 187		8.80 8.50 8.50
Galveston D4. Houston S2. Johnstown, Pa. B3*. Joliet, Ill. A5	172 167	184	167		192	8.35 8.10 8.10	8.35 8.75 8.70
Kokeme, Ind. C9 Los Angeles B2*	169	183		197	178	8.20	8.68
Minnequa C6 Monessen P6	172	186	172	200	192		
Moline, Ill. R3 Pittsburg, Cal. C7 Portsmouth P7	186	204		199	207	9.05	9.45
So. Chicago R3 S. San Francisco C6	. 16	181		195	187	9.05	8.50 8.50 9.45
Sparrows Pt. B3* Struthers, O. Y1	15				193	8,20	8.80

Galvanized products computed with ainc at 5¢ per lb. aceptions: " zinc at 12.5¢ per lb; "* 13¢ zinc. : -- Wholesalers only.

C-R SPRING STEEL

				C	A	R	B	0	N	1	C	DI	N	T	E	N	T				
Cents Per Lb F.e.b. Mill			6-0)								81				. 0		
Bristol, Conn. W/2																					
Buffalo, N. Y. R7				١.																	
Carnegie, Pa. S9																	١.				
Cleveland A5	1	ī.	70		9.	. 8	80	1	2	. (iO		1	5	.1	10	1	1	7.	9	5
Detroit DI												١.					١.				.,
Detroit D2																					
farrison, N. J. CII.																					
ndianapolis C5																					
New Castle, Pa. B4.																					
New Haven, Conn. D																					
Pawtucket, R. I. N7.																					
Pittsburgh S7																					
Riverdale, III. Al								١.						·			1.				
Sharon, Pa. Sl				Į.								١.					١,				
Trenton R4	١.			١.								١.					1.				
Wallingford W1				1.								١.					1.		,		
Warren, Ohie T4				J.								Į,					4.				
Weirton, W. Va. W3.	 1.			1.				١.									1				
Worcester, Mass. A5		8.	25		θ		10	(1	2		H	Ŋ	1	5		31	N.	1	8	. 3	Ľ
Youngstown C5				1				I.				1					1.				

BOILER TUBES

S per 100 ft. carload	Si	10	Seam	dess	Elec.	Weld
lots, cut 10 to 24 ft. F.o.b. Mill	OD- In.	B.W. Ga.	H.R.	C.D.	H.R.	C.D
Babceck & Wilcox	2 21/2 3 3 ³ /2 4	13 12 12 11 10	34.88 46.98 54.24 63.32 84.09	55.01 63.53 74.16		
National Tube	2 21/2 3 31/2 4	13 12 12 11 11	46.98 54.24 63.32	55.01 63.53 74.16	31.13 41.91 48.39 56.50 75.04	
Pittsburgh Steel	2 2 ¹ / ₂ 3 3 ¹ / ₂ 4	13 12 12 12 11 10	46.98 54.24 63.32	49.85 55.01 63.53 74.16 98.47		

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Belts Untreated
Bessemer UI	5.075	6.00	6.35				
So Chicago R3				9 775			
Ensley T2.	5.075	6.00					
Pairneld / Z		6.00		8.775		6.025	
Gary UI	5.075	6.00				6.025	
Ind. Harbor /3.	5.075		6.35	8.775		6.825	
Ind. Harbor Y/ Johnstown B3		I		8.775			
Johnstown B3.	1	6.80					
Jolist Ul	5.075		6.35				
Kansas City S2. Lackawanna B:			1	8.775			
Lackawanna B	5.075	6.00	6.35			6.025	
Lebanon B3							
Minnegua Co	5.075	6.50	6.35	8.775		6,025	13.01
Pittsburgh P5.		1		8.775	12.85		
Pittsburgh 13.		1		8.775			13.10
Seattle B2							
Steelton B3	5.075		6.35			6.025	
Struthers Y1				8.775			
Terrance C7							
Williamsport S.	5	6.15	5				
Youngstown R3				8.775			

COKE

3

Connellsville, Pa							
Foundry, beehive (f.o.b. ove	e en)	. 6	10		U	\$14.10
			. 60	0	1	0	\$17.00
Foundry, oven coke							
Buffalo, del'd							\$30.75
Detroit, f.o.b.					0		29,50
New England, del'd							
Seaboard, N. J., f.o.b	^			-	•	-	26.75
Philadelphia, f.o.b.		6.1		•			26.50
Swadenland De / ch		*	0.10	*			26.50
Swedesland, Pa., f.o.b.				٠	*	8 1	20.30
Painesville, Ohio, f.o.b.	. 1	*		*			27.50
Erie, Pa., f.o.b		e.			×		27.50
Cleveland, del'd							29.43
Cincinnati, del'd							28.59
St. Paul, f.o.b.				C	0		28.50
St. Louis, f.o.b.							30.50
Birmingham, f.o.b				*	*	* '	27.66
Lone Star, Tex., f.o.b		*	. 18		*	*	19.50
Lone Star, 1ex., 1.0.0	¥		- 1	*	*	b.)	13.30

ELECTRODES

Cents per lb f.o.b. plant, threaded, with nipples, unboxed.

G	RAPHITE		CARBON*										
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price								
24 20 16 to 18	84 72 72	23.00 22.25 22.50	40 35 30	100, 110 110 110	9.98 9.90 10.05								
14 12 10 7	72 72 60 60	23.00 23.50 24.75 24.50	24 20 17 14	72 to 84 90 72 72	10.38 10.10 10.35 10.85								
5 4 3 21/2	60 60 60 40 40 30 24	27.25 30.25 32.00 33.75	12 10 8	60	11.75 11.86 12.16								
2	24	52.50											

^{*} Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES	
Anodes	
(Cents per lb, frt allowed in quantit	y)
Cast elliptical, 18 in. or longer.	
	2.92
Brass, 80-20, ball anodes, 2000 lb	
or more	0.00
Zinc, ball anodes, 2000 lb lots 2:	1.25
(for elliptical add 2¢ per lb)	
(rolled depolarized add 26 per lb)	0.50
Cadmium \$	1.70
Cadmium \$1.06 to \$	1.10
Chemicals	
(Cents per lb, f.o.b. shipping point	1
	0.50
Copper sulphate, 5 or more 100 lb	
bags, per cwt 2	7.15
Nickel salts, single, 4-100 lb bags 3: Nickel chloride, freight allowed.	8.25
Sodium cyanide, domestic, f.o.b.	8.50
N. Y., 200 lb drums 2	2.35
(Philadelphia price 22.60)	
Zinc cyanide, 100 to 200 lb 5 Potassium cyanide, 100 lb drum	5.55
N. Y 4	8.00
Chromic acid, flake type, 1 to 20	0.00
	9.25

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolt

Freak	Discounts ill Full case se 20,000 lb tity or more							
1/2 in. & smaller x 6 in. & shorter	61	63						
Larger than ½ in. diam. and all diam. longer than 6 in. Rolled thread carriage bolts	55	67						
1/2 in. & smaller x 6 in. and shorter Lag. all diam. x 6 in. &	61	63						
shorter	61	63						
6 in	55 61	57 63						
Nuts, Hex, HP, reg. & hvy.								
%" or smaller	64 63 65 61	66 65 67 63						
C.P. Hex, regular & hvy.								
%" or smaller %" and larger	64	63						
Hot Galv. Nuts (all types)								
1½" or smaller	44	47						
Finished, Semi-finished, Hex	Nut	3						
%" and smaller	66	66						

Rivets

21									Ba	8€	pe	r 1	00 19
78	m.	ana	larger		0	0 0	0			-	-	-	\$5.95
7/1	6 1	000	l small	0.00						P	CI	O J	List

Cap Screws

	D	iscount H.C. He
Bright Trea	ted	и.о. ис
New std. hex head, pack- aged		
%" thru %" diam. x 6"		
and shorter	34	20
9/16" and %" x 6" and		
smaller and shorter	31	16
shorter	9	+11
¼" thru ¾" diam. x 6" and shorter	49	41
9/16" and %" diam. x 6"		
and shorter	48	39
%", %", 1" x 6" and shorter	31	20
*Minimum quantity per	item	1:
15,000 pieces 4", 5/16", 4 5,000 pieces 7/16", 4", 9/1 2,000 pieces 4", 4", 1" di	dia.	m.
2 000 pieces % " "4" 1" 44	10, 7	diam.
s,ooo pieces 74 , 78 , 1 dis	m. 1552.	

Machine Screws & Stove Bolts

			Disc	ount
Packaged, Bulk, bulk	package list	list	Mach. Screws 27	Stove Bolta 38
	Qu	antity		
¼-in. diam. & under	\$ 25,000	-200,000	20	61
5/16-in. diam. & larger	} 15,000	-100,000	20	61
All diam. over 3 in. long	\$ 5,000	-100,000	-	61

Machine Screw & Stove Bolt Nuts

			Discount						
Packaged, Bulk, bulk	package list	list	Hex 24	Square 27					
		uantity							
%-in. diam. & smaller)	-200,000	18	20					

CAST IRON WATER PIPE INDEX

Birmin	gham										*	119.0
New Y	ork .											131.4
Chicag	0											133.4
San Fr	ranciso	20-L	4 A									140.2
Dec.	1955	va	lue.	. (Clo	188	1	3	01		he	avier
6 in. o	r larg	er.	bel	a	nd	8	pig	70	£ 1	pig	96.	Ex-
planati	ion: #	. 6	7. 8	er	t.	1	68	181	16.		80	urce:
U. S. I	Pipe a	nd i	Fou	nd	ry	C	0.					

REFRACTORIES

Fire Clay Brick	Carloads per 1000
First quality, Ill., Ky., (except Salina, Pa., No. 1 Ohio	add \$5.00) \$128.00
Sec. quality, Pa., Md., F No. 2 Ohio	Cy., Mo., Ill., 114.00
Ground fire clay, net (except Salina, Pa.,	ton, bulk

Silica Brick

Mt. Union, Pa., Ensley, Ala. \$140.00 Childs, Hays, Pa. 145.00 Chicago District 150.00 Western Utah 144.00-165.00
California 170.00
Super Duty
Hays, Pa., Athens, Tex., Wind-
ham, Warren, O., Morrisville
150.00-157.00
Silica cement, net ton, bulk, Latrobe 26.50
Silica cement, net ton, bulk, Chi-
садо 24.00
Silica cement, net tons, bulk, Ens-
ley, Ala 25.50
Silica cement, net ton, bulk, Mt.
Union 23.00
Silica cement, net ton, bulk, Utah
and Calif 35.00
Chrome Brick Per net ton

Standard chemically bonded, Balt. \$98.00 Standards chemically bonded, Curtiner, Calif. 108.00 Burned, Balt. 92.00 Magnesite Brick

Standard Baltimore Chemically bonded,	Baltin	iore		109.00
Grain Magnesite	St. %	to	1/2 -in.	grains
Domestic toh Rali	timore	In	bulk	\$69.40

Domesti	c,	1	.0),	b										\$65.40
in bul													×		43.00
in sac															49.00

negg Bari	iea polo	1810	T U		Per	net	ton
F.o.b. bulk	, produc	ing	pol	nts	in:		
Pa., W.	Va., Ohi	0				. 8	15.00
Midwest							15.60
Missouri	Valley				F = V.		14.00

METAL POWDERS

Board Bosonilla

meine i o meno	
Per pound, f.o.b. shipping point, lots, for minus 100 mesh	in ton
Swedish sponge iron f.o.b.	
Riverton, N. J., ocean bags	8.50€
Canadian sponge iron,	
Del'd in East, carloads	9.5€
Domestic sponge iron, 98+%	
Fe, carload lots	8.5 €
Electrolytic iron, annealed, imported 99.5+% Fe domestic 99.5+% Fe	
imported 99.5+% Fe	27.5e
domestic 99.5+% Fe	36.5€
Electrolytic iron, unannealed	
minus 325 mesh, 99+% Fe	57.0€
Electrolytic iron melting	
stock, 99.84% pure	22.0∉
Carbonyl iron size 5 to 10	
micron, 98%, 00.8+% Fe86.0¢ t	0 21 55
Aluminum freight allowed	38 004
Brass, 10 ton lots37.50# to	50.004
Copper, electrolytic	59.50€
Copper, reduced	59.50€
Cadmium, 100-199 lb, 95¢ plus meta	l velue
Chromium, electrolytic 99.85%	1 AWING
min. Fe .03 max. Del'd	\$5.00
Tand Pe .vo max. Delu	
Lead8.90¢ plus meta	70.0€
Manganese \$3.00 t	0.04
Molybuenum, 99%	\$1.00
Nickel, unannealed	\$1.06
Nickel, annealed	\$1.00
Nickel, spherical, unannealed	*1 19
#80	\$1.13
#80 Silicon	43.50€
Soider powder 1.ve to 9.ve plus me	. VILIUE
Stainless steel, 302	99.04
Stainless steel, 316	\$1.32
Stainless steel, 316 Tin	i value
Tungsten, 99% (65 mesh)	\$4.50
Zinc, 10 ton lots18.75¢ to	32.50€



Ferroalloy Prices

Spiegeleisea Contract prices, per gross ton, lump, t.o.b. Palmerton, Pa. Manganese Silcon 16 to 19% 3% max	Aluffer, 20% Al, 40% Sl, 40% Fe, Contract basis, f.o.b. Suspen- sion Bridge, N. Y., per lb. Carloads Ton lots	10.65#
f.o.b. Palmerton, Pa. Manganese Silcon 16 to 19% 3% max	Ton lots	10.65¢
16 to 19% 3% max	Ton lots	
	Calcium molybdate, 43.6-46.6%	11.80¢
21 to 23% 3% max 98.50	f.o.b Langeloth, Pa., per pound	\$1.84
Manganese Metal	Contained Mo	41.01
Contract basis, 2 in. x down, cents per	x D contract basis, delivered per pound contained Cb.	
pound of metal, delivered. 95.50% min. Mn, 0.2% max. C, 1% max.	Ton lots	\$6.96 6.95
Carload, packed 45.75	Ferro-tantalum-columbium, 20%	0.00
Ton lots	Ta, 40% Cb, 0.30% C, contract basis, del'd ton lots, 2-in, x	
Electrolytic Manganese	D per ib con't sb plus Ta	\$4.65
F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O.,	containers, f.o.b. Langeloth,	** **
delivered, cents per pound.		\$1.54
Ton lots	26%, car lots, f.o.b. Siglo, Mt.	
Fremium for hydrogen - removed	per gross ton	\$90.06
situation of the state of the s		
Medium Carbon Ferromanganese	0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville.	
max. Contract price, carloads, lump, bulk.	Pa., freight allowed, ton lots,	
delivered, per lb of contained Mn 22.85	Ferrotitanium, 25% low carbon,	
Low-Carb Ferromanganese	Falls, N. Y., and Bridgeville,	
Contract price, cents per pound Mn con-	Pa., freight allowed, ton lots,	
Carloads Ton Less	Less ton lots	\$1.50
P, 90% Mn 34.00 36.55 37.75	carbon, f.o.b. Niagara Falls,	
0.10% max. C 31.95 34.95	N. Y., freight allowed, car- load, per net ton	\$200.00
0.30% max. C 30 45 33.00 34.20 0.30% max. C 28.95 31.50 32.70	Ferrotungsten, ¼ x down,	
0.50% max. C 28.45 31.00 32.20 0.75% max. C, 80.85%	W, ton lots, delivered	90.40
Mn, 5.0-7.0% S1 25.45 28.00 29.20	contained Mo. f.o.b. Langeloth,	
Silicomanganese	Pa Washington, Pa.	\$1.3
Contract basis, lump size, cents per	Langeloth, Pa.	\$1.3
1.5% max. C for 2% max. C, deduct 0.2¢	Al, contract basis, f.o.b. Philo,	
Carload bulk 12.00	Carload, bulk lump	17.50
Briquet contract basis carloads, bulk,	Ton lots, packed lump	19.50
Ton lots, packed 15.76	Vanadium exide, 86-89% V ₂ O ₆	
Silvery tren (electric furnace)	tained V ₂ O ₈	\$1.3
ton, freight allowed to normal trade area.	35-40% f.o.b. freight allowed,	
Si 15.01 to 15.50 pct, f.o.b. Niagara Falis, N. Y., \$93.00.	12-15%, del'd lump, bulk-	
	carioads	0.00
Contract price, cents per pound con-	Boron Agents	
tained Si, lump size, delivered, packed.	alloy del. f.o.b. Philo, Ohio,	
96.50% S1, 2% Fe 22.75 21.45	freight allowed, B 3.14%, Si 40-45%, per lb contained 2	\$5.3
	Bortam, f.o.b. Niagara Falls	
	Less ton lots, per pound	50
	Cerbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5%	
Carloads, bulk 7.15	f.o.b. Suspension Bridge, N. I.,	
Ton lots, packed	Ton lots per pound	14.00
Electric Ferrosilicon	max. Si, 0.50% max. Al, 0.50%	
Si, lump, bluk, carloads, f.o.b. shipping	F.O.D. WESD., Pa., NIRKEL FRIIS,	1.3
50% Si 12.75 75% Si 15.40	N. Y., delivered 100 lb up	. 8
65% St 14.50 85% St 17.10 90% St 18.50	14 to 19% B	1.2
	Grainal, f.o.b. Bridgeville, Pa.,	
Eastern sone contract prices cents per	freight allowed, 100 lb and over No. 1	\$1.0
pound of metal, delivered. Cast Turnings Distilled	Manganese - Boron, 75.00% Mn.	. 50
Ton lots \$2.05 \$2.95 \$3.75	15.20% B, 5% max. Fe, 1.50%	
	D. del'd.	
Ferrovanadium 50-55% V contract, basis, delivered, per	Less ton lots	1.0
pound, contained V, carloads, packed.	Nickel-Boron, 15-18% B, 1.00%	
Openhearth 8.19	max. Al, 1.50% max. Si, 0.50%	1
	Sp. 50.50% max. Fe. Carload, packed	Silicomanganese Contract price, cents per pound of metal, 65.65% Mn, 15.20% Silicomanganese Contract basis, lump size, cents per pound of metal, 65.65% Mn, 15.20% Silicomanganese Contract basis, lump size, cents per pound of metal, 65.65% Mn, 15.20% Silicomanganese Contract basis, lump size, cents per pound of metal, 65.65% Mn, 15.20% Silicomanganese Contract basis, lump size, cents per pound of metal, 65.65% Mn, 15.20% Silicomanganese Contract basis, lump size, cents per pound of metal, 65.65% Mn, 15.20% Silicomanganese Contract basis, lump size, cents per pound of metal, delivered, per bol of contained silicomanganese Contract basis, lump size, cents per pound of metal, delivered basis carloads, bulk, delivered basis carloads, bulk, delivered basis, carloads, bulk, silicom Briquets Contract price, cents per pound of metal, delivered basis, silicomanganese Contract basis, lump size, cents per pound of metal, delivered basis, lump size, cents per pound of metal, delivered, per bol of contained silicomanganese Silicom Briquets Contract price, cents per pound of metal, delivered, per bol of contained silicomanganese Contract basis, lump size, cents per pound of metal, delivered, per bol of contained silicomanganese Silicom Briquets Contract price, cents per pound of metal, delivered, per bol of contained silicomanganese Contract price, cents per pound of metal, delivered, per bol of contained silicomanganese Silicom Briquets Contract price, cents per pound of metal, delivered, per pound contained silicomanganese Silicom Briquets Contract price, cents per pound of metal, delivered, per pound contained silicomanganese Contract price, cents per pound of metal, delivered, per pound contained silicomanganese Silicom Briquets Contract price, cents per pound of metal, delivered, per pound contained silicomanganese Contract price, cents per pound contained silicomanganese Contract price, cents per pound contained silicomanganese Contract price, cents per pound contained silicomanganese Silicom Briquets Contract price, ce

SELECTION GUIDE FOR BRAZING FURNACES

Check These Standard HARPER Controlled-Atmosphere Brazing Furnaces Against Your Requirements

CONTINUOUS MESH BELT FURNACE

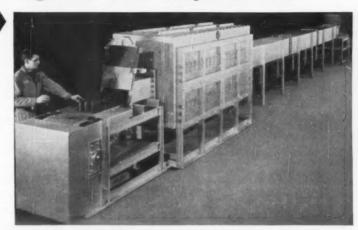
The perfect production furnace for brazing versatility. Provides adjustable speed automatic conveyance, precluding need for special fixtures, trays, etc. Ideal for silver or copper brazing of short runs on different shapes. Belt loading up to 10 pounds per square foot at 2100°F., larger loads permitted at lower temperatures. Belt widths to 24", charge heights to 12"; production capacities to 550 lbs/hr. Completely automatic operation available.

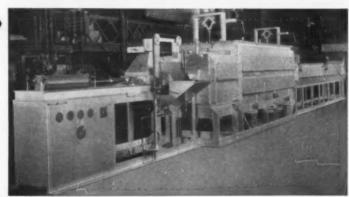
CONTINUOUS PUSHER FURNACE

The mechanical pusher furnace is designed for heavier loading (up to 100 pounds per square foot) and is therefore most suitable for large-production silver or copper brazing runs of heavier assemblies. Trays or special fixtures often used. Provides accurate atmosphere control. Pilot plant or small production units available for manual pusher operation. Standard hot zone sizes up to 18" x 9"; production capacities to 1000 lbs/hr.

ELEVATOR FURNACE

The best batch brazing furnace where maximum heat uniformity is important. Hearth is rolled away from furnace for easy loading, is repositioned under furnace, then raised into heating chamber. Ideal for large and/or heavy loads which must remain free of vibration during brazing. Adaptable to stainless steel brazing when muffle is used. Rapid cooling obtainable by removing work from furnace chamber. Available chamber sizes up to 150 cu. ft.









BELL FURNACE

The bell furnace is similar to the elevator except that the assemblies to be brazed may be stationary throughout the cycle. The load is placed on a fixed hearth and the furnace bell lowered over it. Generally available with nickel alloy heating elements for temperatures up to 2050°F. Special designs may incorporate silicon carbide for higher temperatures. Ideal for stainless work with muffle.

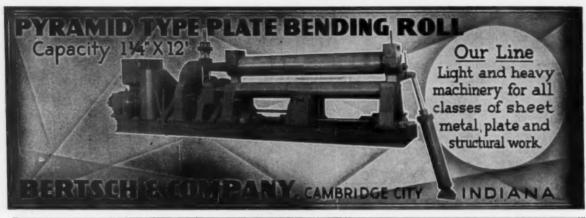
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☐ Mesh Belt ☐ Elevate	or Pusher	☐ Bell
Other	****************	********
Name	*****************	
Title		
Company		
Address		
City	Zone	State





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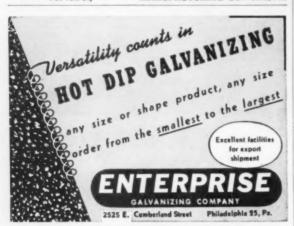
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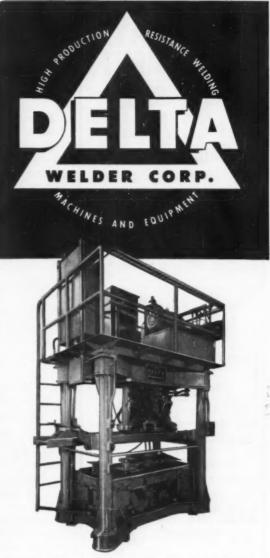
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News of Used and Rebuilt Machinery

Pickup Expected . . . Normal seasonal slowdown in Pittsburgh's used machinery market has been accentuated this year by the steel strike. The lag is not alarming and a September pickup is expected. Moreover, there are a number of bright spots in the current picture.

According to one Pittsburgh dealer, there is an active demand for used fabrication equipment although it's difficult to locate the models wanted. He reports receiving four inquiries for shears in a single day. However, customers were looking for large units—½ to ¼ in. by 10 ft. in width—and the dealer could not put his hands on any. Inquiries for forging equipment and large air compressors are reported heavy but again there is a scarcity of the right models.

Auction Prices High . . . Tight supply is attributed in part to the increasing amount of equipment that is going to auction. One dealer says he is taking little equipment into stock. He calls the prices paid at auctions "ridiculous and prohibitive." Another reports that press brakes and shears went for more than they cost new at a recent sale.

Demand for steel mill equipment is off a little due to the strike. There is considerable interest in bar mills, but the usual problem is finding suitable mills. Mills for flat rolled products have also been in good demand. Interest in the small and medium sized models is believed to stem from widespread activity by companies preparing special metal for the aircraft industry.

Export Is Good . . . The South American market for steel mill equipment has picked up in recent months. There has been a demand for rolling mills in countries like Argentina and Brazil right along. Now the Export-Import Bank is stepping up the supply of badly needed American dollars. However, foreign business is still marked by a high percentage of correspondence to actual orders.

Prices are a growing problem for steel mill equipment dealers. The mills are asking more money for used machinery as the price of new equipment advances. Moreover, there has been a tendency on the part of mills to get away from firm prices in their selling.

Electrical Moving Well... The market for electrical equipment has been holding up surprisingly well despite the steel strike. Demand for motors, generators and pumps has been heavy. There is sufficient equipment available to take care of brisk business. Sales of spare parts have been heavy.

Recent floods have put even more steam into the electrical market. There has been a run on pumps. Replacement and rental motors have been needed in flooded plants. Rebuilding jobs have been coming in at a good rate.

Asking, Not Buying . . . In the crane business, there are lots of inquiries but not too many orders. Customers are looking for cranes in the 50-60 ton range. They want wide-span jobs, less than 10 years old. There is a fairly good assortment of cranes available but most date back more than 25 years.

Crane buyers are reported to be unusually price conscious at this time. One dealer told of scouting around in three cities for a gantry crane. He came up with some pretty good cranes but the customer backed off on the question of price. The high cost of moving cranes is a big stumbling block. It costs about \$2000 to take down a tall gantry.

CONSIDER GOOD USED **EQUIPMENT**

BENDING ROLLS

TRIC TRAVELING 29' Span 230 Volt D.C. 45' Span 220/440 A.C. 55' Span 220 Volt D.C. 96' Span 250 Volt D.C. 40' Span 220/440 A.C. 96' Span 220 Volt D.C. 46' Span 230 Volt D.C. 75' Span 220/3/60 A.C. ton P&H ton Shepard Niles ton Shepard Niles ton Cleveland ton Cleveland ton Cyclops ton P&H ton P&H ton L-B Incl. 300 ft. Runway 80' Span 220/3/60 A.C.

25 ton L-B
25 ton L-B
25 ton Whiting 80'
100 Whiting 80'
FORGHA MACCINES
1" to 5" Acme. Alax, National
HAMMERS—BOARD DROP
800 4 Cambersburg J800 4 Cambersburg J800 4 Cambersburg Jmbersburg J-2 Chambers 1600# Billings & Spencer HAMMERS-STEAM DROP

1000, 1250, 3000 # Chambersburg

HAMMERS—STEAM FORGING

800, 1100, 1500 # Niles-Bement-Pond
1500, 2000, 4000, 8000 # Chambersburg
1000, 1100, 1500, 6000, 12,000 # Erie
10 Ton Massey—New 1942

Confidential Certified Appraisals

LEVELLERS-ROLLER 60" United 17 Rolls 3\%" Dia,
72" McKay 17 Rolls 4\%" Dia,
72" McKay 17 Rolls 2\%" Dia.
84" McKay 17 Rolls 4\%" Dia.
84" McKay 17 Rolls 4\%" Dia,
MULTI SLIDE MACHINE
No. 35 U. 8. Multi Slide Machine

> No. 3 MEDART THREE ROLL ROTARY STRAIGHTENER CAPACITY 1" to 4" DIAMETER PIPE OR TUBING

PRESSES—HYDRAULIC
JOU ton Clearing H-1509-40, 24" Stroke, Bed 36x42"
600 ton Southwark 16" Stroke, Bed 60x74"
750 ton Elmes, 54" Stroke, Platen 30½x38"
800 ton Clearing, 48" Stroke, Bel 48x48"
1000 ton Lake Erle Dible Acting, 46" Strokes, Bed
Area & Platen 12" x 146"

& Platen 72" x 14-STRAIGHT SIDE

Area & Platen 72" x 146"
PRESS—STRAIGHT SID-200 Triple Acting Strokes
Clearing Model TF41500-200 Triple Acting Strokes
PUNCH & SHEAR COMBINATIONS
Style EF Cleveland 36" Throat, Punch 1½" thru 1"
Style W Cleveland 36" Throat, J2 Ton
Pels LUSEFF, Punch 1½" x 1" Shear Angles 6 x
6 x %" Rd. 2½", 8q. 2½", etc.
ROLLING MILLS
10" x 16" Single Stand. Two High
12" x 16" Phila, Single Stand. Two High
12" x 20" Standard Single Stand. Two High
11" x 20" Farrel Single Stand. Two High
11" x 20" G & M Single Stand. Two High

16" x 24" Farrel Two Stand. Two High 22" x 12" x 40" Levis 3-High Sheet Mill 44x28" x 44x144" Three High 26" x 54" United Single Stand. Two High 8" Torrington Ring Type Reversing Mill 80 Lts FORBING BOLLS FORBING 10" wide Strip 8 Stand Waslewood. Spindle 2" Dia. 12"

od, Spindle 2" Dia., 12" Dist. be-

spindles
—GATE
1¼" Williams & White
1" Hilles & Jones
1" 8 & N

12' x 1" S & N SHEAR—ANGLE 6 x 6 x %" Cleveland SHEARS—SQUARING 10' x %" Cincinnati, LATE 12' x 3/16" Niggara SL-12 12' x 3/18" Steelweld LATE 14' x %" Dreis & Krump

UBE MILL Etna Tube Mill, Capacity ½" to 2%" Complete with Welder, Cut-Off and Transformers

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DIAMERS

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ORINTO MACHINES 72" Hanchett 3-spd. rotary surface, new 1946, 13" x 60" Model 300 Hanchett vort. spdl., late. 14" x 36" Pratt & Whitney hyd. vert. surface, 1942, No. 72A5 Heald hyd. gl. internal, extended bridge,

1943.
No. 74 Heald hyd. pl. internal, X-silding H. S., 1941.
12" x 24" Cincinnati ER hyd. universal cyl. serial 2U3SH-5.
16" x 36" Landis type C hyd. pl. cylindrical, 1942.
6" x 36" Cincinnati EA Filmatic pl. cylindrical, 1942.

HAMMERS
No. 3 C Chambersburg pneumatic, serial No. 2297.
No. 6-1 Nazzel, preumatic, late.
No. 6B Nazel, self-contained.

LATHUS
No. 3 Gishelt Univ. Turret Lathes (2), 1942.
14" x 6" Hendey Toolroom, 1940.
15" 30" Lipe Carbo-Matic, 1942.
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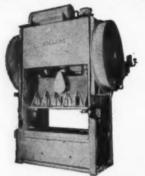
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5-Star Kimbie 1/2 He 850 rem 230 V DC	
Compound Wood Motors	75.00 ea.
9-Star-Kimble 1/2 Hp 850 rpm 220/440 v	
3/60 cy. Squirrol Cage Motor	40.00 ca.
1-Star, Kimbia 3/4 Hp 1150 rpm 220/440	
v 3/60 cy Squirrel Cage Motor	40.00 ea.
'1-Westgh 2 Hp 900 rpm 220/440 v 3/60	
cy. Squirrel Cage Motor	50.00 ea.
5-Westgh 11/2 Hp 1800 rpm 220/440 v	
2/60 ev Sauirrel Case Motor	30.00 ea.
I-Westeh 3 Hp 1800 rpm 220/440 v 3/60	
ey Sauirral Case Motor	40.00 ca.
3Claveland 1/2 Mm 1050 rem 220/440 V	
3/60 cy. Squirrel Cage Motor	20.00 ca.
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ey, Squirrel Cage Motor	20.00 ea.
IWestah 1/2 Hz 1725 rpm 230 v DC	30.00 es
3-1/2 Hp 1200 rpm 220 v 3/60 cy. Squir-	
not Cone Motor	20.00 ea.
4-34 Hp 1800 rpm 440 v 3/60 cy. Squir-	00.45
rel Case Motor	22.00 ea.
1-Cleveland Transformer 15 KVA 220/-	
3/60 av. Prim. & Set	125.00
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Reading 1/2 ton cap Chain Hoists 20	
60 1160	40.00
3-American Pulley #1 Speed Reducers	50.00 es.
13-1	50.00 em.
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Hoist	130.00
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cy. Elec. Hoist	250.00
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Scaffolds, etc.	

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One four high cold strip rolling mill 48 inches wide, by foreign steel mill, with import license and dollar funds available.

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FOUNDRY—MACHINE SHOP—Experienced man wanted as general manager for long established foundry—machine shop. We are interested in a mature person with a background in mechanical engineering. This is an excellent opportunity for the right man who wants to get ahead. Write stating experience, education and references. Address G-392, care The Iron Age, Chestnut & 56th Sts., Philadelphia 39.

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MACHINE TOOL SALES—Experienced machine tool sales engineer and sales mgr. interested in 'eoriesenting machine tool mfr. to Dealers. Will assist in dealer sales promotion, training and closing sales. Have established contacts with dealers. Commission basis. California or entire Pacific Coast area. Address Box G-387, care The Iron Age, Chestnut & 56th Sts., Philadelphia 39.

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WANTED BY WELL ESTABLISHED STEEL FABRICATORS IN CONNECTICUT. EXCELLENT OPPORTUNITY.

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ENGINEER WANTED. "ENGINEERS, DE-SIGNERS AND CHECKERS WHO ARE QUALIFIED PERSONNEL WITH EXPERI-ENCE IN DESIGNING AND BUILDING HEAVY MACHINERY. OFFICES LOCATED IN MID-WEST. EXCELLENT OPPORTUN-ITIES DUE TO BACKLOG OF ORDERS." ADDRESS BOX G-378, CARE THE IRON AGE, CHESTNUT & 56th STS., PHILADEL-PHIA 39.

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METALWORKING BRIEFS

Maritime Strike Threatens Ore Supply

Tieup of the Pittsburgh Steamship Div. of U. S. Steel because of striking maritime unions has resulted in closing down of the Oliver Mining Div. Already aggravated by the steel strike, the ore supply could be dangerously low if the 58-boat fleet continues to remain out of operation.

Bethlehem Denies Chicago Move

Reports that it was behind purchase of a 1200-acre site in the Lake Calumet area south of Chicago have been denied by Bethlehem Steel. The plot, which has access to the New York Central Railroad and the proposed deepwater harbor, has changed hands, but to an undisclosed purchaser. National Steel Corp. has 800 areas nearby. Opening of the area to Great Lakes and ocean-going vessels is scheduled in the next three years.

Freight Rate Increase Asked

Eastern railroad operators were expected to ask the ICC for higher freight rates at a meeting scheduled this week. A requested boost would be in addition to the 6 pct general nationwide increase granted in March. Request estimates varied from 5 to 10 pct.

Steelmaking District Name Changed

THE IRON AGE'S designation of the Wheeling steelmaking district has been changed to the Upper Ohio River District. The new designation better describes the area formerly included in the Wheeling District.

Newport Sale Approved

Sale of the assets of the Newport Steel Corp., Newport, Ky., to the Acme Steel Co., Chicago, for \$16,-450,000 was approved by Newport stockholders. As holder of 98.2 pct of Newport's shares, Merritt-Chapman & Scott Corp voted approval of the sale.

New Cold Mill for Sparrows Point

Mesta Machine Co., Pittsburgh, received contract for design and manufacture of a 48-in., five-stand tandem four-high cold mill to be installed at the Sparrows Point plant of Bethlehem Steel Corp. It will be designed for cold reducing hot-rolled and pickled steel strip of a maximum width of 44 in.

Ford Goes to Wall Street

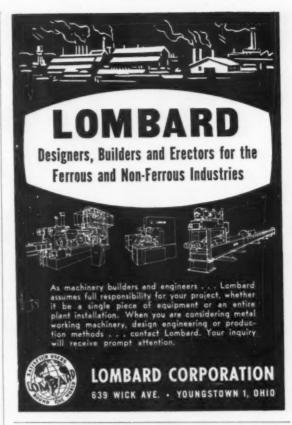
Ford Motor Co. broke precedent by making arrangements to borrow \$250 million from institutional investors. Previously, Ford has financed its expansion out of the company's reserves. Change in policy may be connected with the company's recent sale of stock on the open market. Funds presumably will be used to finance a new line of cars.

An asterisk beside the name of advertiser indicates that a booklet, or other information, is offered in the advertisement. Write to the manufacturer for your copies today.

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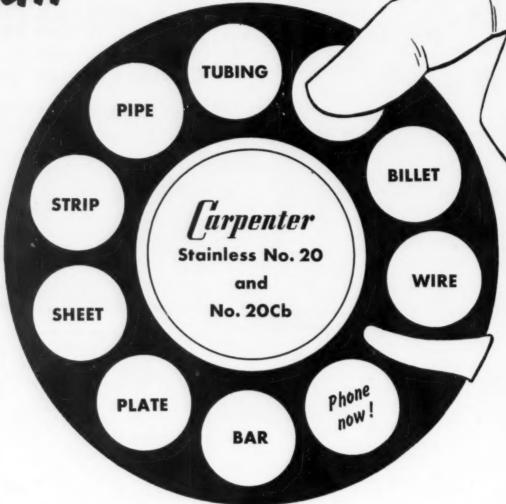
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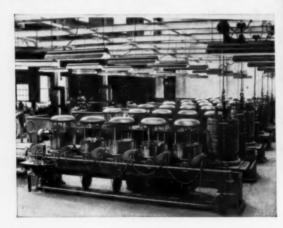
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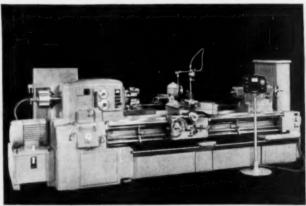


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